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THE

TRANSACTIONS

OF

THE LINNEAN SOCIETY

OF

LONDON.

VOLUME XIII.

LONDON:

PRINTED BY RICHARD TAYLOR, SHOE LANE:

SOLD AT THE SOCIETY'S HOUSE, SOHO-SQUARE;

AND BY LONGMAN, HURST, REES, ORME, AND BROWN, PATERNOSTER-ROW.

MDCCCXXII.

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MISSOURI
BOTANICAL
GARDEN.

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TRANSACTIONS

OF

THE LINNEAN SOCIETY.

I. *Observations on the Natural History and Anatomy of the Pelecanus Aquilus* of Linnæus. By Edward Burton, Esq. F.L.S.*

Read February 3, 1818.

THIS bird is most commonly met with by ships crossing the Atlantic ocean, at a great distance from land, and soaring at an immense height in the air; and is known to seamen by the names of Frigate Bird, Man-of-war Bird, Sea Eagle, and Halcyon. An opportunity having occurred to me of collecting several of them at the Island of Ascension, where they are found in vast numbers during the month of September, which appears to be their breeding season, I propose to give some account of their natural history and anatomy; premising, that the specimens which I procured differ essentially in many particulars from the description of the same bird given by Linnæus.

The average dimensions of five were as follows:

Extreme length between the tips of the extended wings, six feet ten inches; length of each extended wing, three feet two inches and a half; length of the largest of the wing-feathers, one

* *Tachypetes aquila* of Vieillot.

foot five inches; length from the tip of the beak to that of the tail, three feet.

The average weight of the bird with its plumage, is about two pounds twelve ounces; without plumage, two pounds two ounces.

The predominating colour is black; but the back of the male is inclined to a glossy-green, similar to that of the common black cock. The plumage of the female is more dusky; and she differs from the male in having the abdomen and nearly the whole of the head white. The eye and parts immediately surrounding it are black. The beak is of a dirty-yellowish white. The feet of the male are black; those of the female, of a blueish-white.

The beak is of great strength, and not less than four inches and a half in length; both the upper and lower mandibles are curved sharply downwards towards the point. Like all the birds of this genus it has a superficial linear fissure on each side of the upper mandible; and in the mouth are two large longitudinal slits or openings in the palate, near its centre. The tongue is also of the same nature as that of the Pelicans in general, very small and thin, forming an irregular triangle in shape, and its greatest length not more than the third of an inch; it is situated far back in the mouth, immediately above the opening of the trachea. The neck is considerably longer than that of most other birds of the same genus. The male bird is further distinguished from the female by a large fleshy bag or sac placed under the throat, of a bright-red colour, and in its flaccid state putting on a granulated appearance: when distended it is smooth, and enlarges to the size of a hen's egg. The use of this appendage is somewhat difficult to be understood; but the fact, that when the bird is at rest the bag is totally flaccid, and when it rises into the air is immediately distended, (which from the heaviness of its flight can be distinctly seen,) renders it most probable that it is then filled with air, and assists in supporting the upper parts of

the body in its long and arduous flights. From its situation it is particularly adapted to aid the muscles of the neck in supporting the head, which, from the weight of the beak and bones of the cranium, and the length of the neck, are apparently in want of some such relief. The only fact which interferes with this opinion is the want of this sac in the female, in which it is never found: if, therefore, it be given to the bird for the purposes which have been mentioned, it is to be supposed that only the male makes these prodigious flights, and that the female remains constantly near the land, to which the other returns during the breeding season.

In considering the structure of this bird, its most striking peculiarity consists in the disproportion which exists between the wings and the other extremities; a disproportion so enormous, as probably not to be found in any other, if we except the Ostrich and Cassowary, where it is reversed. It may readily be conceived that the habits of the bird render its immense expanse of wing necessary, as it is frequently seen many hundred miles from any resting-place; but the posterior extremity is so diminutive, in comparison with the size and weight of the body, as apparently to be nearly useless. It is totally inadequate to the process of walking, as when on the ground the bird can be taken by the hand without difficulty; and the structure of the foot, the toes of which are webbed only to their second joint, (which is little more than what is found in land-birds,) together with some other points in its anatomy, prove that it never rests on the water, and is deficient in the great peculiarity of all water-birds, the power of swimming. But as this is perhaps the only one of all the sea-birds which is deprived of that power, it may be proper to examine into the fact before it is assumed.

In the first place, when seizing the food which was thrown to

 them

them on the water, these birds merely skimmed along the surface till they could reach it with the beak, without closing their wings or immersing any part of the body, or sitting on the wave, as all the Pelicans and *Procellariæ* do when feeding. Secondly, the structure of the feet before mentioned prevents them from making any progress in the water, when alighted on it. And, lastly, the gland placed above the tail of all swimming-birds, which secretes the oil necessary for preventing the plumage from becoming wet, in this species is of so trifling a size (being not larger than a garden pea) as to be totally insufficient for that office in so large a bird; in proof of which may be alleged the circumstance of the feathers of those which when shot fell into the sea being entirely wet.

However useless the posterior extremity may be on the water, it is nearly equally so on land; for the bird is unable to run or raise itself into the air from the level ground; and preparatory to its flight is obliged to scramble with its legs and expanded wings to the edge of some rock or uneven surface, where the wing can be put into action so as to hold the air.

As, then, the Frigate-bird is unable to swim on the surface of the water, or to dive into it, and as its food is furnished from that element, we must conclude that it is dependent on its power of darting through the air on its prey, for its preservation and existence. Nature has provided it with a tail, of a particular structure, adapted to this action, and to this organ it is indebted for the precision and velocity with which it is performed. The tail consists of twelve proper tail-feathers, varying in length from seven and a half to sixteen inches, the smallest being placed in the centre, and the longest externally. When closed, it consists of a solid mass of plumage, and when spread, forms a large surface, and is forked like that of a swallow. It is capable of all

the intermediate degrees of expansion. By spreading or contracting, raising or depressing these feathers, the bird is enabled to throw itself with the greatest velocity towards the surface of the water, and to seize substances on or near it, by the help of its long neck and beak, with the utmost precision, without immersing its body. The mechanism by which this action is performed will be explained when I speak of some of the most important points of its anatomy.

It has also another mode of supplying itself with food. It is seen accompanying flocks of sea-birds, chiefly the *Pelecanus Piscator*: as soon as these have dived after fish, and begin to ascend with their prey in the beak, it attacks them, and seizes what they have taken. Wherever a number of these birds are collected on or near the water, they are invariably accompanied by some Frigate-birds, which hover directly over them, or follow them in their flight. Their food consists almost entirely of fish, and chiefly of the *Exocoetus volitans*, or flying-fish, which are the most accessible to them; though they probably occasionally feed on such of the *Mollusca* as come within their reach; and will also seize pieces of pork, fowl's entrails, or any animal substance thrown to them. A young one, covered with down, without any appearance of feathers, except the primores of the wings, and unable to move, when taken vomited seven flying-fish; and the stomach and intestines of all those opened were full of the bones of small fish.

The female deposits one egg, of a white colour, nearly resembling a hen's egg, though somewhat larger. The male bird sits,—a fact clearly established, as one was absolutely taken by the hand when sitting. At this time the female is employed in searching for food: at least this appears probable, from the circumstance of all the male birds being taken on shore, while the females were shot at sea; besides the great proportion of the latter

ter which were constantly on the wing, as ascertained by the whiteness of the abdomen.

This bird makes no nest; it merely finds out some slight concavity among the rocks, where there is a little sand, on which it lays its egg. The young one after it is hatched is fed on fish brought to it by the parent birds.

ANATOMY.

I shall only dwell on those parts of the anatomical structure of this bird which appear most essentially to differ from that of others of the same Linnæan genus; and this is particularly the case in its osteology. The bones of the head in general are thick and heavy, and the cavity of the *cranium* extremely small in comparison with the size of the head; so much so, that this cavity of one of the genus *Psittacus*, of equal or even of inferior size, contains not less than three times the quantity of brain. The vertebræ of the neck are very numerous, and have great flexibility on each other. The number of the ribs on each side is seven; the upper one is false, or unattached to the sternum; the other six are true. The process given off by the second, third, fourth, fifth, and sixth, is situated about one-fourth of their length from the sternum, and just before the termination of the first division or joint; it is of nearly similar breadth and thickness with the rib itself, of more than half an inch in length, and descends directly towards the next, lapping over its outer side. The inferior rib wants this process. These appendages serve to strengthen the parietes of the chest generally, to enable the ribs better to support the action of the muscles, and particularly to afford a more extensive surface for the attachment of the great pectoral muscles, the size of which accords with the magnitude of the wing. Each rib is divided into three separate portions, or bones, connected to each other and to the sternum by in-

termediate

termediate cartilages. Of these the vertebral portion is the largest and strongest, and forms in the lower ribs about one half of the whole. The sternum, clavicles, and particularly the bones of the upper extremities, are of a size and strength out of all proportion with the other parts of the skeleton. The pectoral process of the sternum is very deep, to assist as much as possible in giving an adequate surface of attachment to the pectoral muscles. The relative proportions of the bones of the anterior and posterior extremities are so extraordinary as to merit particular observation; on which account I shall mention some of them.

The length of the	Os humeri is . . .	$7\frac{1}{4}$ inches.
	Ulna	$9\frac{1}{2}$
	Radius	$9\frac{1}{2}$
	Os femoris	2
	Tibia	$2\frac{1}{4}$

The length of the os femoris then is to that of the os humeri as one to three and five-eighths; and to that of the ulna or radius as one to four and three-fourths.

The proportions of weight are yet more extraordinary.

The weight of the	Os humeri is . . .	175 grains.
	Ulna	140
	Radius	64
	Os femoris	11
	Tibia	22

The weight of the os femoris is to that of the os humeri as about one to fourteen; and to that of the ulna as about one to eleven.

The bones of the pelvis are so light as to be in many parts transparent; and further to obviate the effect of weight, there is a double row of foramina running down each side of the os sacrum, which in the fresh state are filled with a thin ligament, to

which

which the muscles are attached, serving to lighten these parts still more. The acetabulum is also a large foramen, with the circumference a little raised and thickened; and the head of the os femoris is so irregular, that its motion in the acetabulum must be very limited and imperfect; forming an additional proof how useless this extremity is to the bird.

The structure of the bones of the tail forms one of the most remarkable parts of the skeleton. They are adapted to give support to the great mass of tail-feathers, and form a surface of attachment for the numerous muscles necessary to the various and extensive motions of the tail. They are seven in number, six of which are vertebræ, totally distinct from, and having a great degree of motion in every direction, on each other. A large and strong spinous process arises from every bone nearly perpendicularly, and two long and thick lateral processes, varying in length from half to three quarters of an inch, and connected to each other by lateral ligaments. Every bone, between the spinous process and its body, is perforated for lodging the continuation of the spinal marrow. The upper vertebra is the smallest, the size progressively increasing to the last, which is the largest of the six. The lateral processes of the upper vertebra have a bony union with the pelvis, as well as the inner surface of the body. Each vertebra has small obtuse articulating processes, the inferior being most conspicuous. The two last vertebræ are furnished with additional processes, no appearance of which is to be found in the others: these have a common origin from the inner surface of the body of the bone, immediately become forked, and are turned obliquely towards the vertebra above, over which they lap, serving to give additional attachment to muscles. The structure of the seventh bone is altogether different from any of the preceding: in shape it has some analogy to the vomer of the human cranium, but is less in size, its

longest dimension being about an inch. Its body is thin and transparent, consisting of two lamellæ; towards the root, where it is attached to the vertebræ, it becomes thicker, and has several perforations; on the lower edge it has two depressions, which receive the spinous processes of the fifth and six vertebræ. This bone intervenes between, and serves to support two fatty masses or cushions, of a firm consistence and having almost a glandular appearance, into which the roots of the great tail-feathers are inserted; these lie on the outer surface of the lateral processes of the vertebræ. To various parts of these masses and to the lateral processes of the vertebræ are attached seven distinct pairs of muscles for regulating the action of the tail, which, as has before been observed, appear to be of vital importance to the bird. The upper and largest pair arises fleshy from the dorsum of the pelvis, and tendinous from the back of the lateral processes of the vertebræ, and is inserted into the fatty masses before mentioned: four pairs of muscles of less size also arise from the lower edge of the pelvis, and from the ends of the upper lateral processes, and have their attachment to the same parts: and two pairs have their origin from the inner surface of the bodies of the vertebræ and the lower edge of the pelvis, and are attached close to the termination of the tail-feathers. It is apparent that the action of these muscles, either separately or in their different combinations, is equal to that variety of action, which it has been one of the objects of this paper to prove to be indispensably necessary to the bird's existence.

The muscles of the upper extremities are large in proportion to the bones. The two great pectoral muscles alone are of so enormous a size as to weigh nearly one-fourth as much as the whole body of the bird.

The liver occupies the greater part of the abdomen, and is divided into two lobes of nearly equal magnitude, of much

 greater

greater length than breadth; they run down through the whole cavity on each side of the spine. The gall-bladder is attached to the inferior surface of the right lobe, is very large, and in the birds dissected was found full of bile, in colour and consistence exactly resembling that found in the human gall-bladder.

The œsophagus, as in all these birds, is extremely capacious, and very little inferior to the stomach in its dimensions; a structure well adapted to the precarious mode of feeding to which they are subject, as they are sometimes for a long time destitute of food, and at others gorge to such a degree as to fill not only the stomach, but the œsophagus and even the mouth with entire fish, which are left there to be digested at leisure. I have seen one of the *Sulæ*, when taken, so full of flying-fish as to be unable to close its beak. The parietes of the œsophagus are nearly half an inch in thickness, and the longitudinal bands of muscular fibres are very large and distinct through the whole canal. The convolutions of the intestines are not numerous, and soon terminate in the cloacæ.

The volume of the brain, as has before been remarked, is particularly small, considering the largeness of the head and body: indeed the same remark will hold good with regard to the generality of sea-birds.

The sac situated under the throat of the male is composed of a thin caruncculous membrane, highly vascular, and in structure precisely similar to the gills of the common cock: when flaccid it is thrown up into rugæ, but when distended it is smooth, and the appearance of follicles is lost. On the inside of this sac is placed a thin muscle, which, arising in the lower part of it, forms a loose expansion towards the centre, and sending off several small tendinous chords, is attached by them to different parts of the superior parietes of the sac, exactly in the same manner as the *chordæ tendineæ* are attached in the ventricles of the

the human heart. The use of this muscle is evidently to diminish the cavity of the sac, and to expel the air which it contains when the bird is on the wing. I could not, however, discover by what aperture the air is admitted into, or expelled from it: no connexion between it and the mouth or trachea could be discovered either by the eye, the probe, or the blow-pipe, though the trachea is distinctly seen running behind it through its whole length. But as it becomes inflated as soon as the bird rises into the air, and remains flaccid while it is on the ground, little doubt can be entertained that it is a receptacle for air, and affords an additional facility to its flight.

In conclusion it may be remarked, that the bird which approaches nearest in its habits and general structure to the Frigate-bird, is the *Phaeton æthereus*, or Tropic-bird. Both are seen at immense distances from the land, enveloped in clouds, and scarcely perceptible to the eye. Both seize on their food by darting through the air with inconceivable velocity. Neither, when placed on the level ground, can raise itself into the air. But the great peculiarities of the Frigate-bird are wanting in the Tropic-bird. No air-bag is found under its throat: the lower extremities, though very ill proportioned to the wings, are less so than in the Frigate-bird; and the feet being webbed, it is able to swim, and to feed itself in that position: the plumage is also defended against the action of the water: the structure of the tail is less complicated, and the flight of the bird is chiefly guided by two feathers in it of extraordinary length: nor do the pectoral muscles bear so large a proportion to the size of the body.

II. *The Characters of Otiocerus and Anotia, two new Genera of Hemipterous Insects belonging to the Family of Cicadiadæ: with a Description of several Species. By the Rev. William Kirby, M.A. F.R.S. and L.S.*

Read March 2, 1819.

THE extensive family of *Cicadiadæ*, consisting of the two Linnean Hemipterous genera of *Fulgora* and *Cicada*, although my learned friend M. Latreille has done much towards reducing it to order, is by no means in a state of arrangement so perfect as to preclude further improvement. Considering the great beauty of some species, the almost incredibly singular and grotesque form of others*, and the celebrity which, from the earliest ages, has been attached to a third tribe of them†, it is wonderful that this family has not been more attentively studied, and its genera more accurately distinguished and defined.

The characters afforded by these animals for such distinction are numerous and striking. Not to mention the *promuscis*‡; the situation, length, and composition of the antennæ; the presence or absence of the *stemmata* or *ocelli*, and their number and position; the shape and place of the eyes; the *genæ*; the front and *clypeus*, or rather *nasus*; the shape of the thorax; the figure, veining, and substance of the elytra and wings; and, to name no more, the anal apparatus of the sexes, furnish a variety of excel-

* See Stoll's *Cigales,* Plate XXI. fig. 115; and XXVIII. fig. 163, 164, 169.

† The *Τεττιξ* of the Greeks, and *Cicada* of the Latins.

‡ By this name the rostrum of *Hemiptera* will be distinguished in the *Introduction to Entomology* of Kirby and Spence.

lent

lent diagnostic marks by which the natural genera may be readily ascertained. Amongst the insects of this family, which I purchased at the sale of the late Mr. Francillon's Museum, I found several that would not well arrange under any of M. Latreille's present genera; but I was particularly struck by a set collected in Georgia, and admirably displayed by that expert collector, accurate delineator and painter, and most intelligent observer of natural objects, Mr. Abbot. Upon examining these attentively, I found that they clearly formed two nondescript and very distinct genera belonging to the subfamily of *Fulgorellæ* of the great entomologist before alluded to.

I now beg leave to lay before the Linnean Society the characters of these two genera, with a description of the species in my cabinet.

OTIOCERUS.

CHARACTER ESSENTIALIS.

Antennæ suboculares, elongatæ, basi appendiculatæ.

CHARACTER ARTIFICIALIS.

Antennæ suboculares, elongatæ, exarticulatæ, multiannulatæ, apice setigeræ, basi appendiculatæ: appendiculis antenniformibus, elongatis, tortuosis.

Oculi reniformes.

Ocelli obsoleti aut nulli.

Caput compressum, subtriangulare, supra et infra bicarinatum: fronte subrostrata; rostro sæpius subascendenti.

CHARACTER NATURALIS.

CORPUS oblongum, immarginatum, parvum, agile: cute subcornea.

Caput magnum, valde compressum, subtriangulare*, supra

* Tab. I. fig. 1.

et

et infra bicarinatum*: carinis approximatis, inferioribus præcipue, plus minus ascendentibus, superioribus interdum rectis. *Promuscis* inflexa, filiformis, biarticulata: articulo extimo brevissimo, ad basin pedum posticorum attingens. *Labrum* dimidiato-conicum a naso subdistinctum, promuscidis basin obtegens. *Nasus*† elevatus, compressus. *Genæ* angustæ, lineares, ad nasum adjacentes. *Oculi*‡ laterales, postici, reniformes. *Stemmata*, s. *Ocelli*, obsoleta vix cernenda. *Antennæ*§ inter oculos et nasum, ex processu oblongo tympaniformi membrana obtecta‖, prodeuntes, filiformes aut subclavatæ, elongatæ, subflexuosæ, exarticulatæ, multiannulatæ: apice umbilicato setigero; seta tenuissima, basi appendiculatæ: appendiculis unica vel duabus, antennarum fere longitudine et forma, multiannulatis, tortuosis, apice muticis.

TRUNCUS subglobosus. *Thorax* brevissimus, postice bifidus: lobis** divergentibus, utrinque deflexus: lateribus dilatatis rotundatis. *Scutellum* cum *dorsolo*††, a quo vix distinctum, subrhomboidale. *Postscutellum*†† triangulare. *Lumbale*†† utrinque spiraculo pertusum. *Pedes* longitudinaliter angulati: posticis saltatoriis. *Coxæ* quatuor anteriores elongatæ, lineares: posticis brevioribus, magnis, incrassatis. *Trochanteres* anteriores parvi dimidiato-ovati femorum basi subtus adnexi: posticis duobus magnis femorum basin excipientibus. *Femora* filiformia. *Tibiæ* filiformes, apice calcaratæ: calcaribus minutissimis. *Tarsi* triarticulati:

* TAB. I. fig. 2. *aa*, *bb*. † Ibid. fig. 1. *b*. ‡ Ibid. fig. 1. *c*.
§ Ibid. fig. 1. *d*; and fig. 8. *b*. ‖ Ibid. fig. 1. *f*; and fig. 8. *a*. ** Ibid. fig. 3.
†† *Dorsolum, Postscutellum, Lumbale.* The reader will find these terms explained in the 11th volume of these *Transactions*, part i. p. 105.

lati:

lati: anterioribus quatuor articulo extimo brevissimo; posticis articulo primo sequentibus longiori, secundo extimo breviori, omnibus spinulis semicoronatis, quod non in tarsis anterioribus obtinet. *Tarsi* omnes biunguiculati: unguiculis simplicibus. *Elytra* cuneiformia, corpore duplo longiora, membranaceo-pergamenea*, neurosa†; areolis plurimis; basalibus linearibus, apicalibus parallelogrammicis. *Alæ* dimidiato-cordatæ, pergameno-membranaceæ, elytris breviores et latiores.

Abdomen subtrigonum: carina dorsali; segmentis dorsalibus sex, ventralibus quinque ultimo reliquis majori in medio lobato: lobo rotundato‡; ano *femineo* apparatu sextuplici: laminis duabus inferioribus sinu magno supra excisis§, lateralibus oblongis‖, superioribus triangularibus basi intus rectangulis**; ano *masculo* supra stylo elongato lineari basi incrassato††, subtus forcipe e laminis duabus foliiformibus oblongis concavis sursum arcuatis intus inferiùs sinuatis‡‡ instructo.

This genus is related both to *Fulgora* and *Delphax*; from the former it borrows its rostrated front, and from the latter its reniform eyes and elongate antennæ. It is however distinguished by many peculiar characters, some of which are very singular. Of this description are its compressed head with a double edge both above and below, and its exarticulate multiannular antennæ, furnished at their base with one or two long tortuous appen-

* The term *pergameneus*, in *The Introduction to Entomology*, is used to signify a substance between *coriaceus* and *membranaceus*, somewhat resembling *parchment*.

† For the explanation of this term, see *Introduction to Entomology*, 2d ed. ii. 347.

‡ Tab. I. fig. 7. *c.* § Ibid. *a a.* ‖ Ibid. *b b.*

** Ibid. fig. 6. *a a.* †† Ibid. fig. 4. *a.* ‡‡ Ibid. *b b*; and fig. 5. *a a.*

appendages or auricles. Circumstances to be met with in none of the present genera of this or the other tribes of the *Cicadiadæ*. The absence of the *ocelli*, which are very visible in *Fulgora* and *Delphax*, and the different composition of the anal apparatus of the sexes, furnish further striking distinctions that satisfactorily establish the claim of *Otiocerus* to stand *per se* as a genus.

I possess no less than eight species, all from Georgia, belonging to this genus, which I shall now describe.

Degeerii. 1. O. rubescens, elytris virescente-punctatis: vasis roseis; apice summo pollinoso-niveo.

	♀	♂
Long. corp. lin.	$3\frac{2}{3}$	3.
Expans. alar. lin.	$10\frac{1}{4}$	$8\frac{1}{2}$.

Corpus rubrum, supra dilutius. *Caput* longius rostratum: carinis niveis; superioribus undulatis immaculatis, inferioribus nigro transverse striatulis. *Antennæ* in nostris speciminibus desunt. *Elytra* apice dilatata, albida: neuris roseis; interstitiis punctis rotundis nigro-virescentibus irroratis. Elytri summus apex in medio ex pulvere niveus. *Alæ* albæ: vasis roseis. *Pedes* pallidi.

Mas femina minor: stylo ani inflexo, foliolis intus sinubus tribus.

Stollii. 2. O. rufescens, elytris alisque nigricantibus: vasis roseis, illis apice macula albida.

	♂
Long. corp. lin.	3.
Expans. alar. lin.	$8\frac{1}{4}$.

Corpus pallide rufum. *Caput* magnum, pallidum. *Antennæ* sensim paulo crassiores, capite breviores, fuscescentes, basi appendiculis

pendiculis duabus antenna brevioribus. *Elytra* cum *alis* nigricantia: vasis rubescentibus, apice macula rotundata albida. Apicem versus margine anteriori elytra rosea sunt: punctis sex nigricantibus. *Pedes* albidi.

Abbotii. 3. O. rufescens, alis lacteis, elytris pallidis nigro punctatis.

♂ & ♀

Long. corp. lin. 2.
Expans. alar. lin. 7.

Corpus pallide rufum. *Caput* carinis niveis. *Antennæ* breves, subclavatæ, rufescentes, basi appendicula unica antenna longiori. *Elytra* luteo-alba, nigro sparse punctata, sed basis ipsa immaculata est. *Alæ* lacteæ, iricolores. *Pedes* pallidi.

Mas vix femina minor, antennis capitis fere longitudine: appendiculis duabus antenna longioribus valde tortuosis.

Var. β. Elytris magis luteis.

Francilloni. 4. O. pallidus, alis lacteis, elytris nigro punctatis et fasciatis, abdomine utrinque punctis nigris.

♀

Long. corp. lin. $3\frac{1}{2}$.
Expans. alar. lin. $8\frac{2}{3}$.

Simillimus præcedenti, sed major: *corpore* pallido, nullo modo rufescente; *capite* nigro nebuloso: carinis inferioribus nigro punctatis, *antennis* nigricantibus: appendicula alba: *Elytris* totis nigro punctatis, nec basi immaculatis: fascia insuper obliqua, indistincta, interrupta, ex punctis et maculis nigris conflata, maculis item tribus nigricantibus in margine postico. *Alæ* prope basin intus puncto nigricanti notatæ. *Abdomen* segmentis ventralibus utrinque puncto nigro.

 Coque-

Coquebertii. 5. O. pallidus, elytris vitta apice furcata, punctoque sanguineis.

TAB. I. FIG. 14.

♀

Long. corp. lin. 3.
Expans. alar. lin. $8\frac{3}{4}$.

Corpus pallidum. *Caput* utrinque vitta lata sanguinea. *Antennæ* breves, clavatæ, cum appendicula antenna paulo longiori, rufescentes. *Elytra* pallida: vitta ante apicem furcata; furca magna, lineolaque intermedia, pallide sanguineis. *Alæ* lacteæ.

Reaumurii. 6. O. rufescente-pallidus, elytris vitta abbreviata apice dilatata punctisque quinque nigricantibus.

♀

Long. corp. lin. $2\frac{1}{2}$.
Expans. alar. lin. 7.

Corpus pallidum rufo dilutius tinctum. *Caput* carinis superioribus rectis niveis. *Oculi* subaurati. *Antennæ* in nostro specimine desunt. *Elytra* vitta lata subarcuata apice dilatata, punctisque insuper quinque, tribus in ipsa vitta, nigricantibus. *Neuræ* rufescentes. *Alæ* sublacteæ, iricolores.

Schellenbergii. 7. O. pallidus, capite sanguineo, elytris alisque vasis roseis.

♀

Long. corp. lin. 2.
Expans. alar. lin. $7\frac{1}{4}$.

Corpus pallidum. *Caput* oblongum, sanguineum: rostro obtusiori vix ascendenti; carinis superioribus approximatis niveis, inferioribus

inferioribus fere coalitis albis. *Antennæ* cum appendicula sanguineæ. *Elytra* lutescentia: neuris, costaque apud apicem, roseis. *Alæ* lacteæ: neuris roseis.

Wolfii. 8. O. pallidus, elytris luteolis: vitta fracta punctisque sparsis nigricantibus.

	♀	♂
Long. corp. lin.	$2\frac{3}{4}$.	$2\frac{1}{2}$.
Expans. alar. lin.	$8\frac{1}{3}$.	$7\frac{3}{4}$.

Corpus pallidum. *Caput* vitta obscuriuscula sanguinea lineola nigra in rostri apice terminata: carinis superioribus rectis. *Antennæ* clavatæ, rufescentes: appendicula pallida antenna tenuiori longiori. *Elytra* luteola: vitta obscuriuscula in medio fracta, vel primum a basi ad marginem posticum et dein ad marginem anticum oblique ducta, punctisque quibusdam sparsis nigricantibus. *Alæ* lacteæ.

Mas femina minor: antennis appendicula item unica sed longiori. *Oculi* subaurati.

Two of the other males above described, *viz.* of *O. Stollii* and *Abbotii*, have *two* appendages at the base of their antennæ, but in *O. Wolfii* they have only *one*; so that the genus seems divisible into two sections, **Antennis masculis appendiculis duabus*, ***Antennis masculis appendicula unica*. I would not thus arrange the species here described, because I possess the males of only three of them, and in one of these (*O. Degeerii*) the antennæ and appendages are broken off.

ANOTIA.

ANOTIA.

CHARACTER ESSENTIALIS.

Antennæ suboculares, biarticulatæ: articulo primo brevissimo, extimo elongato infra apicem setigero.

CHARACTER ARTIFICIALIS.

Antennæ suboculares, biarticulatæ: articulo primo brevissimo, extimo elongato paulo infra apicem setigero.

Oculi prominuli, semilunati.

Ocelli obsoleti aut nulli.

Caput compressum, subtriangulare, supra et infra bicarinatum: fronte subrostrata; rostro recto.

Obs. Character Naturalis fere ut in genere præcedenti: sed *Caput* rostro haud ascendenti: carinis superioribus thoracem versus divergentibus, inferioribus approximatis pectus versus convergentibus et demum coalitis. *Promuscis* brevissima vix basin pedum intermediorum attingens. *Nasus* capitis fere longitudine*. *Oculi* prominentes, semilunati†. *Antennæ* capite longiores, biarticulatæ: articulo primo brevissimo et vix ullo‡, secundo elongato, sublineari, compresso, subannulato, sursum apice oblique truncato et subemarginato, ex emarginatura paulo infra apicem summum setigero§. *Thorax* lobis subfractis, apice subemarginatis‖. *Elytra* basi antice dente prominulo reflexo, neurosa: areolis intermediis difformibus, apicalibus triangularibus. *Alæ* dimidiato-ellipticæ.

This genus is intermediate between *Otiocerus* and *Delphax*, but distinguished from both by peculiar characters. From the

* Tab. I. fig. 9. *b*. † Ibid. *c*. ‡ Ibid. *e*.
§ Ibid. *d*. and fig. 10. *a b*. ‖ Ibid. fig. 11.

former,

former, by wanting the appendages at the base of the antennæ: by the comparative shortness of its promuscis; by its very prominent semilunar eyes; by the greater length of its nasus; by the difference observable in the veining of its elytra; and the angular tooth at their anterior base:—and from the latter, by its compressed, bicarinate, subrostrated head; by the comparative length of the joints of its antennæ, the first joint in *Delphax* being very long*; by the absence of the remarkable spur which arms the posterior tibiæ of the latter genus; by its differently-shaped and veined elytra; by the absence of *ocelli*; and by its anal appendages, which in *Delphax* come nearer to those of *Cicada* Latr.† I possess only a single individual of this genus, which is a female, with an anal apparatus similar to that of *Otiocerus.*

Bonnetii. 1. A.

TAB. I. FIG. 15.

Long. corp. lin. $1\frac{1}{4}$.
Expans. alar. lin. $5\frac{1}{4}$.

Corpus pallidum. *Caput* triangulare: linea aurantiaca ab oculis ad rostri apicem ducta. *Oculi* pallidi. *Antennæ* capite longiores. *Elytra* lutescentia: maculis hyalinis; neura obliqua in disco apici propiori, nigra; costa apicem versus sanguineo transverse lineatula. In apice ipso puncta quatuor nigricantia notanda. *Alæ* subhyalinæ: neura disci transversa anteriori nigricanti.

In my specimen of this insect the head is in the vertical position represented in the sketch‡; but this is most likely the direction the animal gives it, when it prepares to use its promuscis: when at rest and unemployed, the head probably assumes a horizontal direction.

* Tab. I. fig. 12. *a.* † Ibid. fig. 13. ‡ Ibid. fig. 9.

These

These two genera, though they belong to the sub-family of *Fulgorellæ* Latr., distinguished by subocular antennæ, require to be placed in a subdivision of it by themselves, on account of their want of *ocelli*.

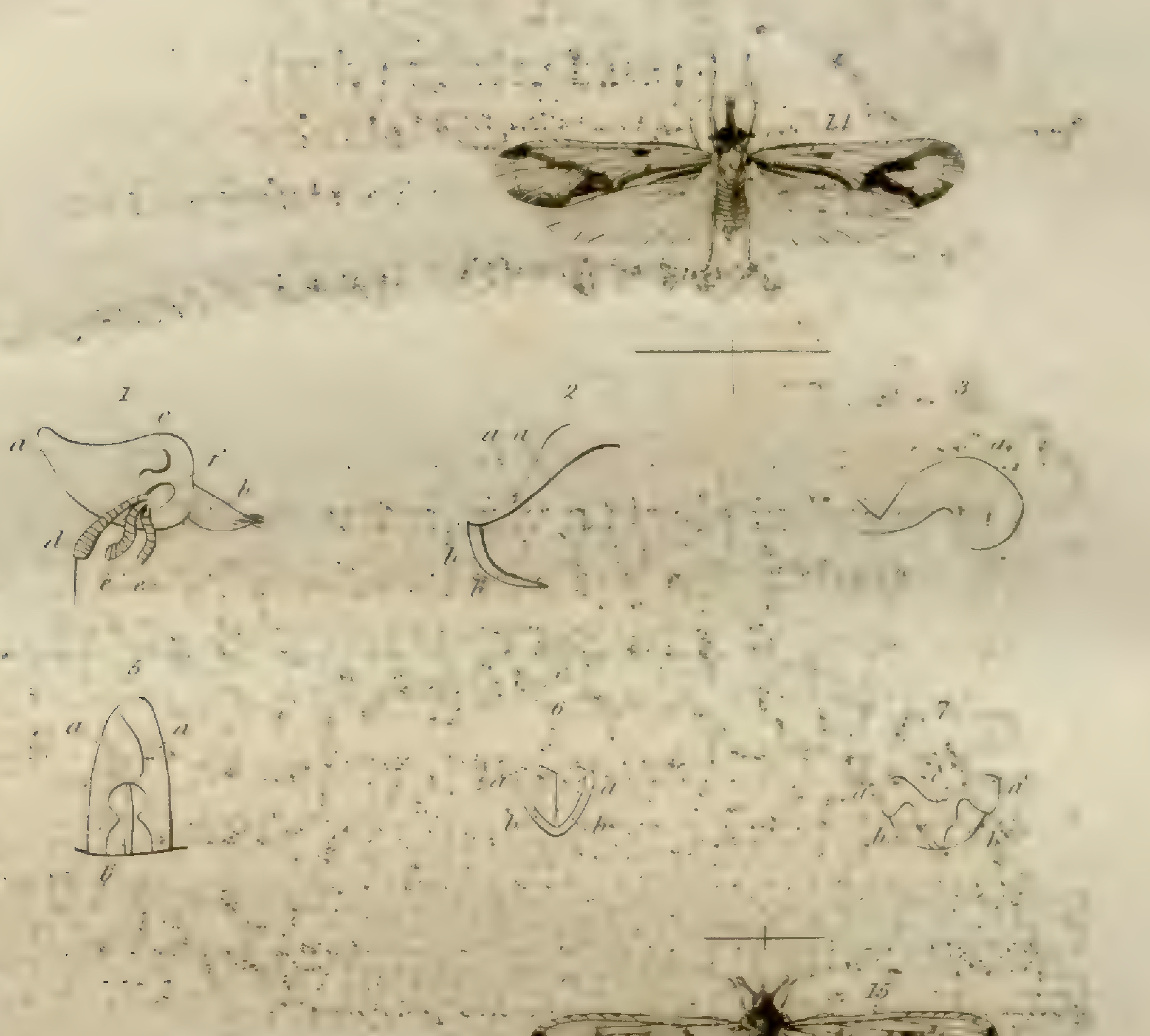
EXPLANATION OF TAB. I.

Details of *Otiocerus*.

Fig. 1. The Head. *a*. The Rostrum. *b*. The Nasus. *c*. The Eye. *d*. The Antenna. *ee*. The Appendages. *f*. The Process from which the Antenna and Appendages proceed.

2. A lateral view of part of the Head to show the Carinæ. *aa*. The upper Carinæ. *bb*. The lower Ditto.
3. Part of the Thorax. *a*. One of the Lobes of Ditto.
4. Lateral view of the Anus of the Male. *a*. The styliform Process. *bb*. The foliiform Ditto.
5. Under view of Ditto. *aa*. The foliiform Processes. *b*. The Male Organ?
6. The upper side of the Anal Apparatus of the Female. *aa*. The upper pair of Laminæ. *bb*. Part of the lateral Ditto.
7. The under side of the same Apparatus. *aa*. The lower pair of Laminæ. *bb*. The lateral Ditto. *c*. The last ventral Segment of the Abdomen.
8. Part of the Head of another Species, the Antenna of which has only one Appendage. *a*. The Process from which the Antennæ, &c. proceed. *b*. The Antenna. *c*. The Appendage.

Details



I. Curtis sculp.

Details of *Anotia.*

Fig. 9. The Head. *a.* The Rostrum. *b.* The Nasus. *c.* The Eye. *de.* The Antenna.

10. Part of the Antenna. *a.* The emarginate Apex. *b.* The Seta.

11. Part of the Thorax. *a.* One of the Lobes of Ditto.

Some Details of *Delphax* Fabr.

Fig. 12. The Antennæ. *a.* The first Joint. *b.* The second Ditto. *c.* The Seta.

13. Its Anus. *a.* Ovipositor? answering to *aa* in fig. 7. *bb.* Lateral Laminæ, answering to *bb* in figs. 6 and 7.

14. *Otiocerus Coquebertii.*

15. *Anotia Bonnetii.*

III. *Ob-*

III. *Observations on the Germination of Mosses: in a Letter to William Jackson Hooker, Esq. F.L.S. By Mr. James Drummond, A.L.S.*

Read March 2, 1819.

Dear Sir,

If you think the following account of some experiments made in the Cork Botanic Garden, by sowing the powder found in the ripe capsules of *Funaria hygrometrica*, and their results, would throw any light on this hitherto obscure part of the physiology of Mosses, I should feel much obliged if you would forward it to the Linnean Society.

The way in which young mosses are produced from the seeds being nearly the same in more than thirty different kinds which I have had an opportunity of observing, I select the *Funaria hygrometrica*, on account of its being one of the most common and best adapted for experiments.

In the month of May 1817 I sowed the powder found in the ripe capsules of this moss on pots of earth, previously prepared by baking in a metal oven. I plunged the pots in a basket amongst moist *Sphagnum palustre*, and the whole I kept covered with a large cap-glass, and shaded occasionally from the sun.

My object being to ascertain by different means the form of the young plants, I sowed at the same time some seeds of the moss in rain-water, in which I found them readily germinate; and by daily examining with a compound microscope the seeds sown in water, and comparing them with the young plants produced

duced in pots of earth, I had an opportunity of observing their true structure, which I found to agree in many particulars with Hedwig's account and figures of the same moss, as given in vol. i. part ii. of the Supplement to the *Encyclopædia Britannica*; but I was not able, by the most careful examination, to discover the roots which Hedwig figures and describes.

The seeds of mosses in germinating produce only one kind of appendages, which Hedwig describes as cotyledons; but to me they appear to differ essentially from any of the parts we are acquainted with in the seeds of phænogamous plants.

In *Funaria hygrometrica* they make their appearance on the second day after sowing, in the form of pellucid points, evidently growing out of the substance of the seed. On the fourth day each minute plant had from one to three of these appendages, each appendage growing out of a different part of the brown covering of the seed, which sometimes appeared torn, as described by Hedwig, from the bursting out of these filaments. On the seventh day they appeared, when magnified with the highest power of a compound microscope, to be about two lines in length, obtuse, jointed; and when growing in water, having some green-coloured particles appearing within them, similar to what we find deposited in the cells of the leaves in a more advanced state of the plant. But I observed that some of the articulated filaments in the pots of earth penetrated the soil in every direction and formed the roots, those filaments only being of a green colour which were growing on the surface. On the tenth day I found these filaments beginning to throw out branches. In a fortnight the surface of the pots appeared as if covered with green velvet, from the numerous branched filaments that covered every part of the soil. About the end of the third week the true leaves of the moss began to make their appearance, shooting up amongst the green articulated filaments,

 and

and attached to them in the same way that we see the serrated leaves and capsules produced in *Phascum serratum.*

That the articulated filaments, supposed by Hedwig to be the cotyledons of mosses, are essentially different from the seed-leaves of phænogamous plants, will appear from the following experiment:—I removed a portion of the surface from the pots in which I had mosses growing from seeds, and I found (provided I did not go deeper than the conferva-like substance had penetrated) that the green part of the conferva, and ultimately the moss itself, was reproduced. And I have since found, that the small creeping roots of *Polytrichum commune* and other mosses, when the soil in which they grow is exposed to the air, throw out green articulated filaments, and produce young plants in a much shorter time than what it takes to produce them from seed. I find the time which mosses remain in the conferva state, before they produce their true leaves, to vary considerably in different species, and even in the same species under different circumstances. When regularly supplied with moisture, *Funaria hygrometrica, Gymnostomum pyriforme, Didymodon purpureum, Bryum hornum,* and some others produce their true leaves in about three weeks from the time of sowing; *Polytrichum undulatum* requires two months; and *Polytrichum aloides* sometimes continues four months in the conferva state; the last mentioned in that state is the well-known *Byssus velutina,* an excellent drawing of which is given in Dillwyn's *British Confervæ,* Plate 77.

The duration of the green part of the conferva-like filaments on the surface, after the mosses produce their true leaves, depends much upon the soil and situation in which they grow; in *Phascum serratum* and *Polytrichum aloides* they are almost always present; and in some mosses, supposed to be annual, I have found them remain and throw up plants in succession for several years.

In

In collecting the seeds of *Funaria hygrometrica* and other mosses for sowing, I selected the most mature and perfect capsules I could get; but I did not find it necessary for the success of my experiments that the seeds should be discharged from the mouth of the capsule. And it is easy to ascertain, by sowing *Funaria hygrometrica* in water, that every grain of powder found in perfect capsules will germinate.

Cork Botanic Garden,
May 4, 1818.

I am, &c.

JAMES DRUMMOND.

IV. *Ob-*

IV. *Observations on some Animals of America allied to the Genus Antilope. By Charles Hamilton Smith, Esq. A.L.S.*

Read May 4, 1819.

Antilope Furcifer.

Prong-horned Antelope. *Travels of Lewis and Clarke.*
Le Cabrit or Cabree of the *Canadian Voyageurs?*

Tab. II.

The specimen from which the annexed drawing was taken is in the museum of Mr. Peel at Philadelphia; it is the only one preserved of those which Messrs. Lewis and Clarke sent to the President of the United States during their exploratory travels up the Missouri. It is a complete skin of an adult male, stuffed with great skill, although in a very indifferent state of preservation. Through the liberality of Mr. Peel I was enabled to make the drawing, and to take the following dimensions:

Total length from nose to tail . . .	5 feet	8 inches.
Height from the top of the shoulders to the soles of the fore-feet . . .	3	1
Length of the head	1	0
From the base to top of the horns in a straight line	0	9
Ditto ditto along the curve . .	0	11
Distance from tip to tip	0	10½
Circumference of the body behind the fore-legs	3	4
Length of the tail	0	1½

In

C. Ham. Smith del.

Antilope Furcifer.

I. Curtis sculp.

In the general aspect this animal resembles the chamois, though considerably larger in all its dimensions: the nose is small, and the nostrils are formed like those of a sheep; the forehead broad, with the edges of the orbits of the eyes strong and prominent; above and somewhat within the posterior part of the orbits are placed the horns, which in form and character differ from every known animal of the ruminating order; they are about five inches in circumference at the base, laterally compressed, nearly flat on the inside and roundish on the outside; obscurely wrinkled and striated, and marked, principally on the inside, with small horny pearls resembling those on the horns of the stag. From the base they carry the same thickness upwards about seven inches, where the anterior part terminates in a compressed and striated snag, pointing forwards and upwards, and forming a fork with the posterior part, which becomes suddenly round and taper, and curves backwards and inwards, ending in an obtuse point: their position on the head is nearly two inches asunder, hanging slightly forwards and outwards over the eyes; the colour brown-black; the horny substance is thin at the base and a little translucent, and the hollow within sufficient to fit the two forefingers of a man's hand. The teeth, as far as they were visible, appeared similar to those of other antelopes of equal size. No lachrymary sinus was distinguishable, nor could I detect the existence of similar cavities behind the horns, as are observed in the chamois. The ears are about six inches long, narrow, pointed, fawn-coloured, and lined inside with long white hairs. The forehead, nose, temples, neck, back and hams are of a foxy dun-colour, with the sides paler: the lips, chin, throat, a spot below the ears, one under the throat, breast and belly yellowish-white: the croup, and the long hairs which form a tuft on the stump of the tail, clear white. All the legs are bright ochre-colour, slender, yet firm. The pasterns

remarkably

remarkably long, and the hoofs small, pointed and black, measuring scarcely half an inch from the crown to the sole: there are no tufts on the knees. The texture of the hair is soft and straight, falling off readily: from between the shoulders it points forward on the ridge of the neck, and from the horns, where it is longer, it turns backwards, meeting at the occiput, where it forms a kind of tuft. The eye, according to a memorandum, is hazel-colour; and the whole animal presents a character uniting vigour with considerable beauty.

Having had an opportunity of showing the drawing to a very intelligent Indian of the Kluche nation*, inhabiting the western branches of the Stony Mountains, he recognised the figure immediately, and stated its name to be *Kistu-he*, or, as he translated it, Little Elk. He observed that during winter, when enormous heaps of snow cover the mountains, these animals come down into the plains, and that they are at that time covered with long whitish hairs.

The species is found over a vast extent of country in central North America, ranging in small herds, or rather families, along the middle regions of the Stony Mountains, where they seem to fill the station which the chamois does in the Alps; mixing occasionally with the American *Argali*, which occupies the summits. They spread to the eastward along the banks of the Upper Missouri, and are remarkable for prodigious fleetness: to this capacity Messrs. Lewis and Clarke bear ample testimony; yet the Indians hunt them with success. In the memoranda of a journal written by Mr. Charles Le Rey, a Canadian trader, who passed several years of captivity among the Siour Indians, it is stated that, being with the hunters on the river Jaune in pursuit of these

* This man had come from Nootka-Sound, and had been for some years a servant to an English fur-merchant: he spoke English, and bore a singular resemblance to a Chinese Tartar.

animals,

C. H. Smith del.

Horns of Antilope palmata.

I. Curtis sculp.

animals, the party selected for the sport a hill the ascent of which was gradual, but the opposite side precipitous: at the bottom of the slope they formed a chain of hunters, and crawled gradually and simultaneously towards the summit, inducing the game to approach the precipice. When arrived at a convenient height, they all suddenly rose and gave a loud yell, which terrified the timid creatures so completely, that most of them sprang over the brink and were dashed to death in their fall. Upwards of sixty cabrits and big-horned sheep were thus slain in a single beat*.

ANTILOPE PALMATA.

Mazame? *Hernandes.*

TAB. III.

I have adopted the trivial appellation of Palmated Antelope merely to distinguish an animal the horns of which are preserved in the museum of Surgeons'-college, Lincoln's-Inn Fields. I am indebted to Sir Joseph Banks for the knowledge of the existence of this highly interesting specimen, and to the liberality of the Curators of that splendid establishment for permission to make a drawing, of which the annexed is a copy. All I could learn of their history is, that they were presented to Mr. Hunter without a memorandum; consequently without giving any idea of the animal, or of the country from which they were brought. By some persons they were considered as a monstrous production: in their appearance, however, they bear so great a resemblance to the horns of the animal before described, that they are either of a species immediately allied to it, or possibly only a variety.

Part of their base is wanting; what remains is about eleven inches and a half long, measured upon the curve. At their pre-

* There is an imperfect copy of this journal printed at the end of *A Topographical Description of the State of Ohio,* 8vo. *Boston,* 1812.—I have seen a manuscript.

sent

sent base they are two inches and a half in their greater diameter, by one across. The anterior and posterior parts are compressed into a sharp edge, exhibiting the appearance of a hard, black and brittle horny scabbard, with the surface strongly pearled and striated for about seven inches towards the summit: here the anterior part of each horn terminates in a compressed, leaf-like, obtuse, deflected, striated and pearled point; the posterior part assuming a round, taper, and regularly uncinated form, much larger and more pointed than the preceding. Upon or near the ridge which unites the leaf-like part to the after-horn, are one or two small knobs or button-like horny pearls, somewhat resembling the buds of incipient ramification.

In the museum these horns are placed together upon a bit of wood; but I apprehend their relative situation to be transposed: that is, that the right horn is fixed on the left side. This I judge from the analogy they bear to those of the Prong-horned Antelope; and because, if the hooks bent outwards, they would arrest the progress of the animal. I have therefore ventured to place them in the drawing in what I presume to be their true position. The reasons which induce an opinion that these horns belong not to a variety, but to a species distinct from the Prong-horned Antelope, are, that the section of the base of the Palmated Antelope's horn is lozenge-shaped (◊); whereas that of the Prong-horned Antelope is a compressed oval (⬭): that the former is on both sides striated and pearled to the bottom, or at least as far as the present base; while the latter is only striated on the surface next the forehead, and wrinkled on the outer side:—that these are not sexual differences, is evident from the horns of the Palmated Antelope being more bulky than the others, which belong to an adult male. Hence it may be concluded that they belong to a new and as yet undescribed species, the habitat of which will probably be found to be in some mountainous

part

part of America. It is perhaps proper to observe that the *Cervus pygargus* of Pallas, as figured in Schreber's plates, bears a strong resemblance in many particulars to the first-described species. I am ignorant whether Professor Pallas had opportunities to examine this species of deer with his usual accuracy.

It appears that the early writers who noticed the natural history of the new hemisphere were acquainted with one, and probably the Palmated species of these animals. I had an opportunity of comparing the figure of the Mazame in Hernandes with the stuffed specimen at Philadelphia; and though the engraving is clumsily executed, there can be no doubt that it was done from one of these animals, and the description distinctly points out the most prominent characters. "Mazames," it is observed, "caprarum mediocrium, paulove majori, constant magnitudine; pilo teguntur cano et qui facile avellatur, fulvoque; sed lateribus et ventre candentibus . . . . . Cornua gestant juxta exortum lata, ac in paucos parvosque teretes ac præacutos ramos divisa et sub eis oculos." Recchus justly viewed this and another species which I shall presently notice, as Antelopes, or, in the language of his time, as Capreæ. He says, "Hos (Telethcalmaçame et Temamaçame) ego potius computaverim in Capreos quam inter Cervos*."

Antilope Mazama.

Antelope of Honduras? *Anderson's Hist. of Honduras*, 8vo.
Mazame seu Cervus cornutus. *Seba*, *tab*. xlii. *fig*. 3.

Count de Buffon, in his article *Des Mazames*†, assumes that there were neither musks, antelopes, nor goats, nor any analogous

* *Nard. Ant. Recchus apud Hernandesium,* lib. ix. cap. xiv. p. 324 et 325. figuras ad ipsas paginas.

† The word *Mazame* or *Maçame* is derived from the Mexican *Maçatl*, which I apprehend Baron Humboldt has affixed without sufficient reflection to the Virginian stag.

gous animals in America at the time of the discovery of that continent. This opinion, for which he certainly could not have sufficient grounds, led him into the error of ascribing the animals mentioned by Recchi in Hernandes, to the deer or roebuck kind. Indeed, the singular form of the horns in one species, rudely figured in the work, sufficiently justified a doubt, if he had not persisted in describing the other and the two figures in Seba as deer or as African animals, notwithstanding that the last-mentioned author, who obtained many of his specimens from Dutch Guiana, positively asserted that they were both from New Spain. The existence however of one, if not of both the species, in the warmer parts of America, is established in my own mind from the following circumstance.

Some years ago, while I was on the coast of the Gulf of Mexico, under circumstances peculiarly unfavourable to research in natural history, the canoe in which I was having anchored within the river St. Juan, the Musquito Indians who were with me brought an animal on board, inferior in bulk to a domestic goat, but higher on the legs ; in aspect resembling a small lean sheep, with soft hair instead of wool : the horns about six inches long, obscurely annulated, dark-coloured, bent back and pointed : general colour pale-rufous brown : belly, inside of legs, breast and chin yellowish-white : grey about the eyes and nostrils : tail thick and short : legs more stout than those of African antelopes : hoofs black : and the whole animal somewhat heavy in make. I was then unacquainted with the figure in Seba, and it appeared an undescribed species. Having, however, no mate-

stag. As far as my own inquiries have gone, the word is generic for the deer, antelopes and musks of America. *Tetlelcal Maçame, Temma Maçame, Maçatl Chichiltic, Yziac Maçame, Tlamacaz que Maçatl, Quauht Maçame,* and *Tlahuica Maçame,* all denote different animals, some of which are certainly not deer. I shall perhaps resume this subject, if opportunities should offer, to notice several species of deer of America, some of which are new, and the others imperfectly known.

rials

rials for making memoranda, I was obliged to defer it; and my hungry companions soon disposed of it. I wrote to the late Dr. Brown* upon the subject, and he consulted Dr. Dancer of Jamaica, who pointed out the figure in Seba; but as there was no copy of this work within my reach, I was obliged to defer my inquiries until my return to Europe. The figure in Seba is incorrect in expression; but when compared with his description to my own memorandum, the identity appears to me fully established. He observes, "Mazame seu Cervus cornutus. Hæc species omnino differt ab illa quam Guinea profert. Capite et collo, crassis curtisque est, et bina gerit tornata quasi cornicula, in acutum recurvumque apicem convergentia, retrorsum reclinata. Auriculæ grandes, flaccidæ; at oculi venusti. Cauda crassa, obtusa. Pilus totius corporis subrufus est, paulo tamen dilutior, qui caput et ventrem tegit. Femora cum pedibus admodum habilia†." Buffon, who confounds his Cariacou with the Mazames, did not observe that the Cariacou or female of the Bajeu deer of Guiana has a small moist muzzle like the rest of the deer kind; while the Mazames or antelopes of the same country have the nose of a sheep; at least as far as they have come under my observation. In the History of Honduras by Mr. Anderson, the antelope is noticed; but (I quote from memory) he represents it as perfectly similar to *A. Dorcas*. The specimen which I saw, appeared however to bear a greater resemblance to the figure of the Chinese antelope about the head, or even to *A. Saiga*, than to the *Dorcas*:

* Surgeon of the Royal Artillery at Port Royal, and known as a botanist.

† As I have not drawn the figure from the animal, but rather from recollection and the sight of Seba's, I refer to that author for it. His collection was purchased by the Prince of Orange, and passed along with it into the Museum of Paris. It is to be hoped, that, should the specimen still exist, a better figure will be published there. I cannot help observing, that the horns of this animal have a singular resemblance to those of the *A. lanigera* and the *A. Sumatrensis*.

 but

but as I am not positive as to the sex or age of mine, his judgement may be more correct.

Antilope Temamazama.

Cervus Maçatl chichiltic seu Temamazame? *Seba.*
Capra Pudu. *Molina?*
Ovis Pudu. *Linn. Syst. Gmel.*
Spring-back of New Jersey?

I now come to a fourth species of American Antelope, the existence of which is more doubtful; but which, in the opinion of the natives of the United States, formerly abounded and is still occasionally found in the state of New Jersey, where it is known by the name of the Spring-back. This denomination is a corruption from the Dutch spring-bock; and these people being the first settlers in that colony makes the term *bock* (male of the goat) the more remarkable, because their forests abounded with the American roebuck and Virginian deer: they must therefore have been acquainted with the appearance of cervine horns in all their varieties of age and species; consequently the animal so named must have borne a character which justified in some measure the term applied. This character, it is asserted, is that of the antelope, though it is possible that it refers in reality to a species of deer whose horns are always single shoots. In the Museum of Philadelphia there is a part of a skull with the horns attached to it brought out of the Jerseys, and said to be those of the spring-back: they are however decidedly cervine, and the production of a young deer, or of an undescribed species. But the misapplication of a name does not destroy the probability of the existence of an analogous animal to the antelope, if not any longer in New Jersey, at least in the hills and sandy plains along the frontier of New Mexico and the province of Santa Fé.

I pos-

I possess a copy of a drawing obtained from an American gentleman, who stated it to have been taken from an animal shot near the sources of the Red River. Its form is light and slender; the nose small and ovine; ears long, narrow, and rounded at the tips; the tail several inches in length, and carried erect like that of a goat. In the memorandum accompanying the drawing, the size was stated "to equal a large kid; the horns to be above five inches and a half long, black, slender, and wrinkled at the base, lying straight along the prolongation of the forehead, diverging and then bending back at a slight angle." The colour resembles that of a roebuck, but is somewhat more rufous: the mouth, a patch on the throat, belly, and inside of the legs and underpart of the tail, white; the eyes dark and full.

This description will hardly admit the supposition of the animal's being a modification of the domestic goat run wild. It agrees with the *Ovis Pudu* of Molina: but the figure in Seba, and still more his description, coincide. He says, in the explanation of Tab. xlii. no. 4: "Cervus Maçatl chichiltic seu Temmamaçame dictus. Horum ingens numerus per alta montium Novæ Hispaniæ divagatur, qui gramine, foliis, herbisque victitantes, cursu saltuque velocissimi sunt. Europæos cervos habitu referunt, sed instar hinnulorum valde parvi. Cornua tornata, recurvatum in acumen convergunt, quæ singulis annis, nova spira aucta, ætatem animalis produnt. Cornuum color coracinus. Oculi auresque magni et agiles. Dentes prægrandes et lati. Cauda pilis longis obsita; brevioribus et dilute spadiceis universum corpus vestitur." Referring to Hernandes, we find a similar animal figured, but with very heavy proportions. His specimen is perhaps a variety; for the "brevissimis cornibus acutissimisque, coloris fulvi, fusci et inferne albi" differs from the above, but resembles in the colour of the belly the figure in my collection. See Hernandes, p. 325.

ANTI-

ANTILOPE LANIGERA.

Rupicapra Americana. *Blainville.*
Ovis montana. *Ord.*

TAB. IV.

This species, which Mr. Ord has noticed, in a Memoir read to the Society of Philadelphia, under the denomination of *Ovis montana*, exhibits a compound character sufficiently anomalous to render a precise classification very questionable. Dr. Blainville, in his newly proposed subdivision of the genus Antilope, has arranged it next to and in the family of Chamois or Rupicapræ, under the appellation of *Rupicapra Americana.* There is, however, no coincidence of characters to justify this arrangement; unless it be that this animal like the chamois inhabits mountainous regions. The Prong-horned Antelope has a better claim to the denomination of chamois; and the epithet *Americana* is of too vague a nature, as several congeners are already known to exist in America: I have therefore ventured to propose the trivial appellation of *lanigera*, which, as far as we know, is exclusively the character of this species of antelope. The specimen from which Dr. Blainville took his short notice is that in the Museum of this Society, and the same from which the annexed drawing was taken*. Mr. Ord had still scantier materials for description, there being in the Philadelphian Museum only the scalp with one of the horns attached to it, and the skin without head or legs; it having served an Indian for a cloak. While I was at Philadelphia I examined this skin, and found it small, nearly destitute of the long hairs, but covered with very fine downy wool. I took it for that of a young animal, and was confirmed in this conjecture upon viewing another in Canada,

* The specimen here described and figured, was presented to the Linnean Society by the late Lieut. General Thomas Davies, F.R.S. and L.S.

which

Trans. Linn. Soc. Vol. XIII Tab. IV p. 38

C. H. Smith del. *Antilope Lanigera.* I. Curtis sculp

which was much more hairy, but said to have been without horns: the head and feet were wanting when I saw it.

As the specimen preserved in the Museum of this Society is the only one (at least as far as I have been able to discover) existing in a stuffed form in any museum, and as Dr. Blainville has merely noticed it, I presume that the figure, with a more detailed account of an animal extremely interesting in several points of view, will prove not unacceptable to those at least who have no opportunity of examining the original.

The specimen being inclosed in a glass case, I am not enabled to give the dimensions. In bulk it exceeds the largest sheep: the nostrils, ridge of the nose and position of the eyes, resemble a ram's: the ears are rather long and pointed, filled inside with long hair: the neck appears short, the body long, the tail stumpy, the legs short, and the whole structure of the animal exceedingly robust. The colour is wholly white: the bulk of the body is considerably increased by a thick coat of long straight hair, of a yellowish tinge, but softer to the touch than that of a goat: this hair is particularly abundant under the throat, about the shoulders, the neck, back and tail: it covers the upper arms and hocks of the animal: below lies a close downy wool of a clear white colour, and in young animals feeling like unspun cotton: on the face and legs the hair is short and close, similar to that of sheep: the eye-lashes are white. The horns, which are not placed on the head in the specimen, are about five inches long: above an inch in diameter at the base, bending slightly back, having two or three annuli, and terminating in an obtuse point: the females have probably none. The horns at Philadelphia are not above three inches long, the base forming a kind of pedestal half an inch high, and the points subarcuate and sharp: they are black. The legs exceed in thickness those of a large calf: the fetlocks are short and perpendicular, and the hoofs

hoofs of a jet black, high, broad, and with deep grooves in the soles.

If I am not mistaken, Captain Vancouver first noticed this animal at Nootka in his voyage round the world. I was assured that it was found as far to the south-east as the Lake of the Woods near Lake Superior; from thence it inhabits the regions west of Hudson's-bay to the shores of the northern Pacific.

In the present state of our knowledge, it is probable that this and the two preceding species form a small natural family; and the two first described another: and that eventually they will all require a distinct classification from the Antelopes of the old continent;—but this question must be left to the decision of future anatomical investigation.

V. *Cha-*

V. *Characters of a new Genus of Coleopterous Insects of the Family Byrrhidæ. By William Elford Leach, M.D. F.R.S. and L.S.*

Read May 4, 1819.

MURMIDIUS.

Genus novum.

Antennæ 10-articulatæ: articulus 1 crassus maximus: 2 magnus angustior: articuli 3—9 angustiores filiformes (articulis 3—8 subglobosis; 9 elongato): articulus 10 clavam abruptam ovato-globosam efformans.

Palpi maxillares et *labiales* filiformes; articulus ultimus apicem versus paulo angustior.

Corpus orbiculato-ovatum.

Tibiæ compressæ, ultra medium gradatim latiores, apice abruptissimè acuminatæ: *tarsi* filiformes.

Spec. 1. Murmidius *ferrugineus.*

M. ferrugineus, antennis pedibusque (illis præsertim) dilutioribus, elytris fortiter punctato-striatis: punctis impressis.

Long. corp. $\frac{1}{2}$ lin.

I am indebted to Sir Joseph Banks for this highly interesting genus: it was found in a box of seeds and fruits received from China, in considerable plenty, attaching itself more especially to such as contained saccharine matter.

 VI. *De-*

VI. *Description of some Shells found in Canada. By the Rev. Thomas Rackett, F.R.S. A.S. and L.S.*

Read June 1, 1819.

HELIX ANGULATA.

H. TESTA imperforata utrinque concava, anfractu primo utrinque angulato.

TAB. V. Fig. 1.

Habitat juxta Lacum Huron. Testa diametri ½ pollicis, transversaliter striata, lutea, anfractibus 3 vel 4 contiguis. Apertura ampla marginata.

HELIX MONODON.

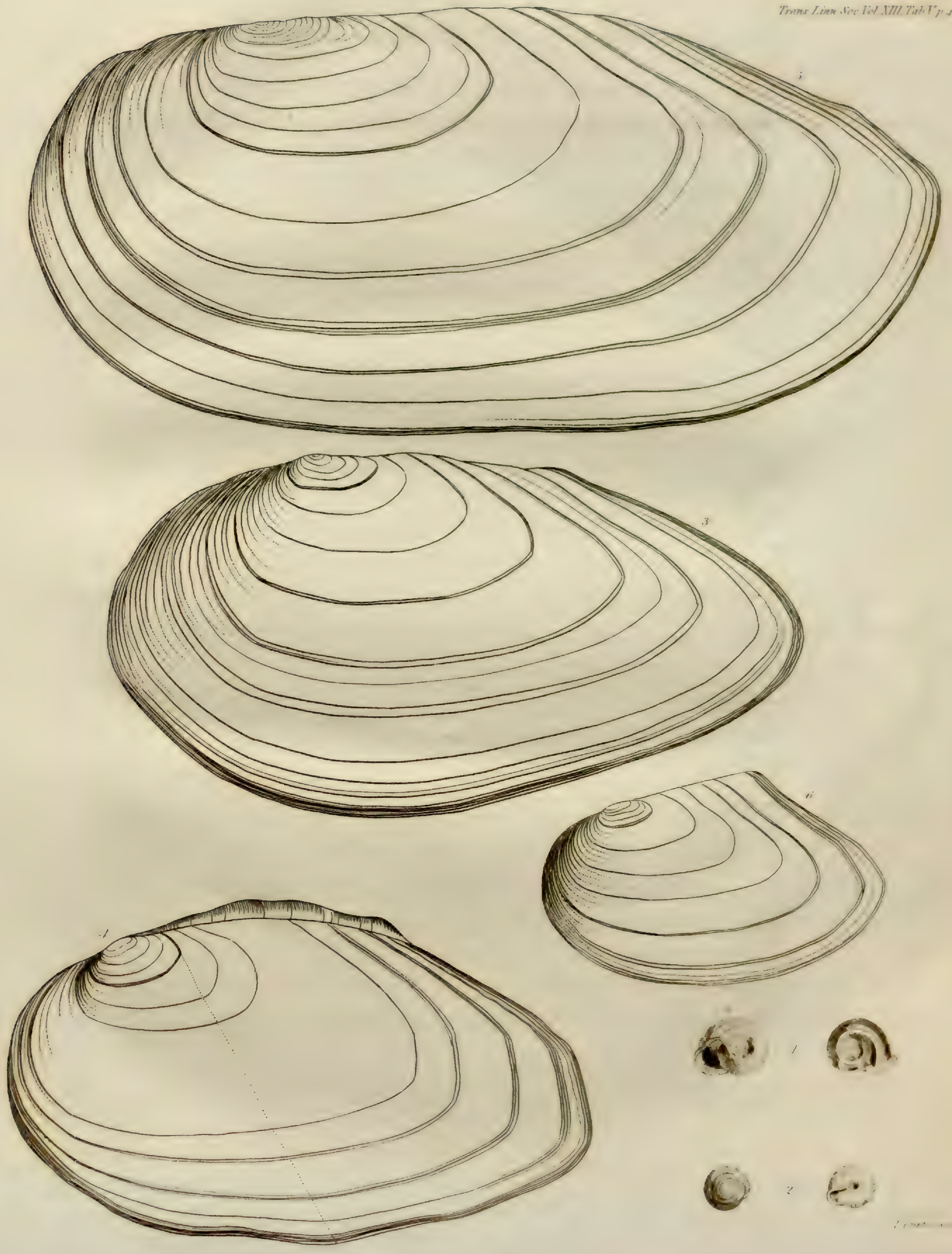
H. testa convexiuscula striata umbilicata, dente transversali, apertura lunata.

TAB. V. Fig. 2.

Testa diametro vix ½ pollicis cornea, anfractibus 6 rotundioribus. Margo aperturæ alba. Dens unicus transversalis, in anfractum.

With these shells were likewise found *Turbo fontinalis*, *Helix palustris*, a single valve of a thick *Mya*, the size of *Mya pictorum*, and two *Bullas*; but being single specimens and much worn and bleached, I will not venture to pronounce them new species.

These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3
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These testacea were found by Edmund Sheppard, Esq. of the Royal Artillery, in Canada in the year 1816; the *Mya* at Elliott's Point, a mile below the town of Malden, on the shore of Lake Erie: the remaining shells on the shore of Lake Huron, a little above Thunder Bay, where the beach is formed entirely of shells.

VII. *On*

VII. *On the Indian Species of Menispermum. By Henry Thomas Colebrooke, Esq. F.R.S. and L.S.*

Read November 2, 1819.

AMONG doubtful or imperfect fruits described under barbaric names by the elder Gærtner in the concluding section of his work, the very last which is noticed by him* is one denominated *Wal-tiedde* and *Keipisan Zeylonens.*; concerning which he expresses a doubt whether the seeds be naked or were included in a pericarpium.

On this subject Du Petit-Thouars, followed by Richard† and Decandolle, has conjectured that the plant in question is "a species of Cissampelos, of which the seed only has been hitherto described‡." This guess has undoubtedly approached to the truth; as the seed certainly appertains to a plant of the same natural order, but perhaps of a different genus, being not improbably a variety of Decandolle's *Cocculus villosus*; or at least very nearly allied to *Menispermum hirsutum* Linn., which (therein following Lamarck) he considers to be but a variety of this author's *M. villosum*.

I herewith submit to the inspection of the Society the delineations of two kindred plants, from which any one, who will take the trouble of comparing them with Gærtner's figure of his *Wal-tiedde*, will be satisfied of the near agreement of the fruit.

When the similarity was first remarked by me, I was unaware

* Tab. 180, fig. 12. † *Anal. du Fruit*, 47. ‡ *Regn. Veg.* i. 532.

that

that a like observation had been previously made by Roxburgh, but unpublished; and, in corroboration of mine, I now transcribe from his manuscript the description of his *Menispermum hirsutum*, and add my own of a plant denominated by him *M. villosum*;—a name pre-occupied, and for which I have therefore substituted another (*M. incanum*).

Roxburgh's *M. hirsutum*, which he considered to be the same with *M. hirsutum* of Linnæus and of Willdenow, and for which he cites a figure from Plukenet's *Phytographia* (*t.* 384. *f.* 5.) as agreeing better with it than the figure quoted by them for the plant so named, has cordate leaves (broad-cordate to linear-cordate) and emarginate nectarial scales, with racemes on the male plant, and solitary axillary flowers on the female.

Lamarck's *M. villosum*, identified by him with *M. hirsutum* and *M. myosotoides* of Linnæus, and for which he cites three figures from Plukenet (*t.* 384. *f.* 3, 5 and 7), is described with leaves ovate or lanceolate-ovate, and ramose sub-corymbose peduncles, from one to three in an axil*.

Roxburgh's *M. villosum* (my *M. incanum*) has broad-cordate mucronate leaves, entire nectarial scales, and panicles on both male and female plants.

Willdenow's *M. hirsutum*, described from a figure of Plukenet's (*t.* 384. *f.* 7) and Houttuyn's Compilation (iv. *p.* 616), has ovate-oblong mucronate leaves, with corymbs on the male plant and racemes on the female. He probably considered Lamarck's *M. villosum* the same with *M. myosotoides* Linn., which is described from Plukenet's third figure (*t.* 384. *f.* 3), and Burmann's Indian Flora (316), as having linear-lanceolate leaves.

Roxburgh's *M. hirsutum*, said by him to be common in hedges in India, is the only plant which he found that he could compare

* *Dict.* iv. 97.

with

with *M. myosotoides.* He asks, "Can they be the same?" He first described it on the coast of Coromandel; and, re-examining it in Bengal, delineated anew the fruit, and identified it with Gærtner's *Wal-tiedde.*

I cannot but deem it distinct from Willdenow's *M. hirsutum*, as well as Lamarck's *M. villosum*, on account of the difference of the inflorescence joined to that of the leaves; and I therefore insert the whole of Roxburgh's description for the purpose of comparison.

We have thus four species nearly allied, yet sufficiently discriminated by their leaves, inflorescence, and other specific marks: two of them hitherto unpublished. A third unpublished species with downy leaves may be added from Roxburgh. It is his *M. tomentosum*, described with leaves anteriorly three-lobed, racemes axillary, and nectarial scales entire.

M. fenestratum of Gærtner has been noticed by Decandolle, as by earlier writers, among "species not sufficiently known;" remarking, that the fruit alone has been examined*." He was unapprised that "the plant had been figured and described by Roxburgh, from whose manuscript I subjoin a description of the female plant.

It will be observed, that Roxburgh testifies the accuracy of Gærtner in his representation of the seed. He has also cited that eminent carpologist's figure and description of *M. Cocculus* as a correct representation†. His testimony, though not pointed, must seem to extend to the peculiar character so particularly noticed by Gærtner, and affirmed by him to belong to all the species of the genus, however much these vary in the number of floral parts, yet all agreeing in the singular position of the coty-

* *Reg. Veg.* i. 541. Vide Lam. *Dict.* iv. 101; and Martyn, *Dict.* vol. ii.

† *Fl. Ind.* Mss. cit. Dec. *Reg. Veg.* i. 520.

ledons

ledons described as segregate, and occupying distinct cells in the albumen*.

That character is not however found in *M. sepium* (*M. hirsutum* Roxb.) nor in the *M. crispum* Linn. (identified with *M. tuberculatum* Lam. and *M. verrucosum* Roxb.†) In respect of the first mentioned, the delineation before exhibited has, as I trust, established the fact; and in support of the same position, regarding the last mentioned, I herewith offer to the inspection of the Society a complete delineation of it, subjoining Roxburgh's description of the fruit in corroboration of my own. The inflorescence of the female plant and its immature fructification had not been seen and described by him, nor by any earlier botanist, though the species has been so long known and so frequently noticed; and it is chiefly for the sake of the female flower that I now offer a specific description at large.

I may be allowed to adventure a surmise, that the segregate position of the cotyledons is alike wanting in many, perhaps most, other species of this family or genus, notwithstanding the sweeping affirmation of the venerable Gærtner. Indeed his own description of the seed, identified by Roxburgh with *M. hirsutum*, shows it in that instance.

Nor does this disagreement in the characteristic situation of the cotyledons appear to concur with a co-ordinate difference of the flower, to assist the much needed reform of the genus. The nectarial scales are indeed wanting in *M. fenestratum*; and on that ground I wish to propose the construction of a new genus, of which the character may be built upon that plant. But the flower of *M. Cocculus* Gært. (*Cocculus suberosus* Dec.) has not been yet examined and made public; and it is uncertain whether this plant will accompany Gærtner's *M. fenestratum*, or travel apart into another subdivision of the group.

* Gært. *Fr. et Sem.* i. 220. † Dec. *Reg. Veg.* i. 521.

Before

Before I proceed to propose a generic character for Gærtner's Ceylonese plant, I must premise a few observations on the parts of the flower in that whole group.

The Linnæan genus *Menispermum*, constructed on the Canadian species, assumes for a calyx two short linear exterior leaflets; for an outer corol, six (4—8) ovate, spreading, equal petals; for an inner corol, eight smaller, concave, obcordate scales ranged in a double series: it notices sixteen fertile stamina in the male, and half as many sterile in the female; and 2—3 (rather 2—4) pistils, whence two monospermous berries arrive at maturity. Here the quaternary order, in a simple or double series, or a multiple of it, is apparent.

The defect of a fourth part throughout the fructification would seemingly connect with that character numerous Indian species, in which likewise two small exterior floral leaflets are observed in some, but wanting in others; and rows of calycine leaflets, petals and scales in ternary order; and the ternary proportion single, or a multiple, prevails among stamina and pistils.

The two exterior leaflets do not seem in all, nor in most, of these plants to be a calycine envelope of the flower, but in some are wanting; and in others, again, are evidently mere bractes or floral leaflets, closely appressed to the true perianth in some instances, separate and distant in others, and reduced even to a single bracteal leaflet in certain examples.

The first ternary series of leaflets, or in some specimens a double ternary series of equal leaflets, I take to be in general the true perianth. They are smaller than the next row within. This, which is likewise ternary, and consisting of larger, tenderer, and, in short, petal-like leaflets, appears properly to be the corol.

The innermost row, comprising six scales at the foot of the filaments, commonly much smaller than the ternary range which encompasses

encompasses it, seems to be nectarial. The term of inner corol may however be retained for it, if judged preferable. It is wanting in some plants of this family.

The number of fertile stamens is commonly six: but in one instance three; in another many. The sterile filaments are in general equally numerous in the female flower.

The number of pistils is commonly three; but in one instance twelve; in another six. Their germs contain solitary ovula attached to the middle of the inside of the cell. They ripen into as many drupes or monospermous berries: but in one instance the nut is described by Roxburgh as two-celled.

The seeds are lunulate or spheroidal. In the latter case they contain a chamber or cavity; and their form is, as it were, generated by a semi-revolution or expansion of the more natural lunula.

The quaternary proportion of the American species, contrasted with the ternary of the Indian, furnishes a ready and obvious ground for a first subdivision of the genus, whether into sections or distinct genera. That ground has been taken by Decandolle, who leaves to the Canadian moon-plant and its congeners the name of *Menispermum*; and severs the rest under the ancient denomination of the most noted Indian sorts (*Cocculus**).

This nevertheless requires revision, with a view to further separations; as it yet constitutes but a heterogeneous group. Materials, however, are wanting for the complete reformation of it. Of some plants comprehended in it, the male flower only has been examined; of others, the female; of several, neither of them, but the fruit alone, or merely the climbing shrub without fructification. It would be premature, then, to attempt the entire rectification of it at present; though it may be meantime suggested, that the *Menispermum heteroclitum* of Roxburgh,

* *Reg. Veg.* i. 511, 515, and 540.

 which

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which is monadelphous, should found a new genus: not to say as much for his triandrous and his hexagynous and dodecagynous species. The task of constructing genera upon the type of the most distinct among these will be here attempted, after a few further observations on the fructification.

The fruit, and particularly the segregate situation of the cotyledons in separate cells of the perisperm, may contribute to the discrimination of genera in this family, and consequent reform, as before hinted: but the shape of the nuciform seed, though various, does not promise to serve for a distinctive character, unless for sections of genera. The four species first noticed in this Essay, *Menispermum sepium*, *hirsutum*, *incanum*, and *villosum* (*Cocculus villosus*), cannot in a generic distribution be disjoined from *M. crispum*, *verrucosum* s. *tuberculatum* (*Cocculus crispus*), as will be evident, if the complete delineations of the plants are compared together: and, on the other hand, the singular structure of the nut with a central chamber, which is so remarkable in the last-mentioned species, recurs in *M. fenestratum* as well as in *Menispermum Cocculus* of Gærtner.

The lunulate or uncinate and almost cyclical shape of the one, will be found more strictly analogous to the sub-globular but hollow or excavated form of the other, than may be at the first view apparent. For, as before intimated, the one form is but an expansion of the other, being enlarged to afford room for broader seminal leaves of the embryo; and its solid figure is to be considered as generated by an incomplete revolution of the lunula on its axis: and thus the uncinate shape, laterally expanded, produces a cavity or chamber in the solid of revolution. The kidney-shaped seed of *Menispermum tomentosum* of Roxburgh, with a pit on the inner side, is the link to connect the two forms.

Upon these considerations, I shall not pretend to deduce any character from the fruit or seed for the genus proposed to be constituted

constituted upon the type of Gærtner's *M. fenestratum*, but rely chiefly upon the total absence of an inner corol or nectarial scales.

It may seem a premature attempt to construct a generic character upon the type of a dioicous plant, the male of which is yet unexamined; and in some measure it assuredly is so. But in this family of plants the floral integuments or exterior parts are usually quite alike in both flowers: and the female exhibits sterile filaments, which in general are equally numerous with the fertile stamina of the male: and for this reason the characteristic features of both may, with a considerable degree of confidence, be concluded from inspection of the female singly.

COSCINIUM.

Dioicous. *Cal.* 3-leaved. *Petals* 3. *Nect.* (int. cor.) none. *Stam.* 6! *Pist.* 3. *Drupes* (berries) 1—3, 1-seeded.

Menispermum fenestratum. *Gært.* i. 219. *t.* 46. *f.* 5.

Veni-vell gettah. *Ceyl.*

The absence of an inner corol or nectarial scales occurs likewise as a discriminative mark in another plant, which has been described as a *Menispermum*: but the stamina, being there numerous and monadelphous, furnish, as I think, a sufficient character on which to erect a distinct genus. Though the fruit appear to be that of a *Menispermum*, the calyx and corol are not like the other Indian species of that comprehensive genus.

The plant to which I refer is the *Menispermum heteroclitum* of Roxburgh; from whose manuscript I subjoin a description of it. Presuming the correctness of the association of the ripe fruit with the male plant described, there can be little hesitation on the subject. But, as the female flower has not been examined, nor the plant itself figured nor described, together with the mature fruit, a lurking suspicion may exist that some error has

 possibly

possibly crept in, to be corrected by future examination when opportunity shall offer.

Meantime, trusting to the usual accuracy of the observer, the following essential character of a new genus is proposed on the foundation of his description. Its denomination is assumed from an Indian term contrasting it with a name of a common *Menispermum.*

ANAMIRTA.

Dioicous. *Cal. ext.* 2-leaved; *int.* 3-leaved. *Petals* 3, equal. *Nect.* (int. cor.) none. *Stam.* many, monadelphous. *Pist.* 3! *Drupes* (berries) 1—3, 1-seeded.

Menispermum heteroclitum. *Roxb. Mss.*

Proceeding with the task of examining Roxburgh's description of plants referred by him to *Menispermum*, I come to one which he appears to have intended, when delineating it, to erect into a genus; a design which he abandoned when composing his *Flora Indica.* As the plant is polygynous, and the nut affirmed to be bilocular, I apprehend a doubt could scarcely exist (presuming accuracy in regard to the cells of the fruit) as to the propriety of pursuing his earlier view, and severing this plant, which bears but a family likeness to *Menispermum*, and instituting a new genus for its reception.

Yet Decandolle, who identifies this plant with *M. acuminatum* of Lamarck, described* from a specimen communicated by Sonnerat, refers it to his comprehensive genus *Cocculus*; not, however, without a hint for its transfer to another genus†.

The description of the plant in question will be quoted at large from Roxburgh's manuscript: and the following is the essential character proposed for the genus, retaining for it a vernacular name, which is sufficiently sonorous, notwithstanding its barbaric origin.

* *Dict.* iv. 101. † *Reg. Veg.* i. 528.

TILIA-

TILIACORA.

Dioicous. *Cal.* twice 3-leaved. *Petals* 3. *Nect.* (int. cor.) 6-leaved. *Stam.* 6; alternate ones shorter. *Drupes* (berries) many. *Nut* 2-celled?

T. racemosa.

Menispermum polycarpon. *Roxb. Mss.*

To complete a review of the *Menisperma* collected by Roxburgh, and more or less perfectly described by him, several yet remain to be spoken of, which are sufficiently remarkable to deserve particular notice; besides *M. glabrum* of Kœnig, identified with *M. cordifolium* of Willdenow (*Cocculus cordifolius* Dec.), and *M. Columba*, which is the same with *M. palmatum* Lam. (*Cocculus palmatus* Dec.); and exclusive of one named but not described by him, *M. megaspermum.*

The first to be here mentioned is *M. hexagynum*, to which allusion has been before made. The male flower and mature fruit have not been seen and described. But the section of the germ in Roxburgh's figure of the female blossom indicates a genuine member of the family group, to which Decandolle appropriates the name of *Cocculus*; and so do the nectarial scales (or inner corol), and the other parts of the flower, consisting of a three-leaved calyx with a pair of bractes closely appressed to it; three petals twice as large; and six barren filaments.

Another, to which likewise allusion was before made, is *M. triandrum*. The male flower, without either female blossom or ripe fruit, has been figured and described. It has nectarial scales (or inner corol); and in other respects also affords no indication of a fit subject for separation from the larger group in this family, notwithstanding the paucity of its stamina. Its calyx is three-leaved, minute. Its corol urceolate, three-petalled.

One

One more plant is to be mentioned, which is remarkable for its peculiar habit; differing from the whole of the natural order to which it belongs, as it is arboreous, while all the rest are twining shrubs. I mean *M. laurifolium* of Roxburgh: seen likewise by Dr. Buchanan Hamilton and General Hardwicke. The male plant alone has been figured and fully described; the inflorescence only of the female: but notwithstanding its singular habit, which might give occasion to surmise that it has not found its proper place, there is nothing in the fructification, as delineated, which affords any support to such a surmise. It has a three-leaved calyx, a much larger three-petalled corol, six nectarial scales (inner corol), and as many stamina. Probably, therefore, it will remain where it has been put, or rather will pass with its congeners into the genus *Cocculus*.

A singular vivaciousness has been remarked in three or four, and probably holds in more, species of this genus. Wherever the climbing and rambling stem is divided, whether cut or broken, it roots afresh by sending down from the upper portion a thread-shaped root to the ground, and thus continues to derive nourishment from the soil, however distant. Such radicant fibres have been measured thirty feet long, and no thicker than a packthread. This character of vivaciousness appertains to *Cocculus tomentosus*, *crispus*, and *cordifolius*; as also *C. Malabaricus*, a plant figured in the *Hortus Malabaricus**, but which has not been re-examined since the days of Van Rheede.

Without any design of undertaking to treat the subject fully, or of attempting to exhaust the topic, a few observations may be here added, tending to clear the way in some measure towards a future reform.

The generic character of Decandolle's *Cocculus*, as it will be here taken, is confined within more restricted limits than as given

* Vol. vii. *t.* 19 and 20.

by

by that author. He has made it comprehend certain monoicous plants and hermaphrodite flowers, and sweep several distinct genera established by Willdenow and other writers. I shall briefly notice some of them.

Lamarck, upon specimens communicated to him by Sonnerat, described a species of *Menispermum*, to which he gave the name of *radiatum*; and cited a figure of the *Hortus Malabaricus* (vol. vii. *t.* 3.) as representing the same species. Willdenow, quoting the same figure, and intimating also his own inspection of a dry specimen, instituted a distinct genus, under the name of *Braunea*, for a plant which he identified with Kœnig's *Menispermum glabrum*. Kœnig's plant of that name is however identified by Roxburgh with *Menispermum cordifolium* of Willdenow, who cites for this species Klein's communication of it by the name of *M. glabrum*; intimating likewise his own inspection of a dry specimen in this instance also. Roxburgh, it is to be observed, is a great authority in regard to Kœnig's botanical researches in India, having been his fellow-labourer in those researches.

The concurrence of two eminent botanists in quoting the same figure from the *Hortus Malabaricus*, is the only ground for presuming the identity of the two plants; their descriptions of which are by no means parallel. It is to be remembered too, that Willdenow had Lamarck's work before him, and made constant use of it when he was employed on the genus *Menispermum*. It appears, therefore, that he was dissatisfied with Lamarck's description, as he has made no reference to it. Indeed, if Willdenow's accuracy may be implicitly trusted in regard to a minutely small flower examined by him in a very dry state, he had good cause for constructing a new genus for a plant, of which the female blossom not only wants the nectarial scales, or inner corol, but exhibits a solitary germ, and in the mature state a tricoccous berry.

In

In truth, Decandolle suspects that it does not properly come into his genus *Cocculus:* but his hint for re-establishing it as a distinct genus is accompanied with a suggestion for associating it with his *Cocculus acuminatus* (*Menispermum acuminatum*), identified by him with Roxburgh's *Menispermum polycarpon* (*Tiliacora racemosa*). That suggestion is seemingly countenanced by the multitude of berries in the mature fruit, stated as from three to six*: but on what authority that number is given does not appear. For Willdenow assigns to his plant (*Braunea menispermoides*) a single tricoccous berry; Lamarck (*M. radiatum*) specifies but one berry; and Van Rheede describes seven to eight ripe fruits on a raceme, not explaining in the text or by the figure the greatest number ripened from one flower, nor the number of germs comprised in the blossom.

Upon the whole, the identity of the plants appears questionable; and Willdenow's generic character of the plant examined by him may be retained until an opportunity occur for examining a more recent specimen; when it will probably be found that his description needs material correction.

The *Fibraurea tinctoria* of Loureiro, described as having a naked flower, and his *Limacia scandens*, having a quadruple integument of the female flower, and a triple of the male, are scarcely to be reconciled with the generic characters of either Decandolle's *Cocculus* or the Linnæan *Menispermum*. They require no doubt a careful re-examination: but in the mean time must continue unassociated with the genuine species of either genus.

* *Reg. Veg.* i. 528.

COCCULUS.

COCCULUS.

Dioicous. *Calyx* 3-leaved. *Petals* 3. *Nect.* (int. cor.) 6 scales. *Stamina* 6 or 3. *Pistils* 3 or 6. *Drupes* 1—3 (or 1—6), 1-seeded.

Cocculus *incanus*. C.

Menispermum villosum. *Roxb. Mss.*

Leaves cordate, entire, villous, mucronate. *Panicles* axillary, shorter than the leaves.

A large perennial climber, native of Chitagong and Silhet in Bengal; named in last-mentioned province *Sundi-lat*. It twines over trees to a great extent, and is in flower and fruit at divers seasons of the year.

Stem perennial, twining, round. The whole plant villous and soft like velvet. Pubescence white. *Leaves* alternate, petioled, broad-cordate to deltoid and ovate, terminated by a minute dagger point, five-nerved, sub-entire; posterior lobes of the cordate leaves round in some, and straight in others. Length 2—4 inches. Breadth somewhat less. *Petioles* round, half as long as the leaf. *Stipules* lanceolate, acuminate, caducous. *Panicles* axillary, solitary or in pairs, shorter than the leaves, subglobular. *Flowers* yellowish-green, inodorous. *Bractes* at the ramifications of the panicle and base of the pedicel, subulate; a minute one appressed to the calyx. *Perianth* three-leaved. *Leaflets* obovate, coloured, villous. *Petals* three, scarcely longer, spreading, alternate with the calycine leaflets. *Nectary* or interior corol, six scales, small, oval, with incurved margins. ♂ *Filaments* six, capillary, erect. *Anthers* two-lobed. *Lobes* round, opening by circular pores at the summit. *Pistil* none. ♀ *Filaments* six, clavate. *Anthers* none, but barren knobs terminating the filaments. *Germs* three, subglobular, flattened on the contiguous sides. *Styles*, from the inner

inner side of the apex, short. *Stigmas* reflex. *Drupes* one or two, rarely three; lenticular, dark-purple, size of a lentil, succulent, sessile on the scarcely-enlarged summit of the pedicel. *Nut* lapideous, discoid; disk flat, smooth, thinnest towards the base; margin thick, broad, echinate with elevated tubercles, and lobed with deepened furrows; one-celled, one-seeded; with an anterior depressed chamber between the approximated plates of the disk. *Seed* solitary, uncinate, many-lobed, as pitted by the ample furrows of the putamen. *Perisperm* conform to the seed; amygdaline, milk-white: one-celled. *Embryo* inverse, uncinate, almost cyclical, occupying the middle of the perisperm nearly in its whole length; milk-white. *Cotyledons* linear, curved. *Radicle* curved, opposite the point of adhesion of the fruit on its receptacle. *C.*

Cocculus *sepium.* *C.*
Menispermum hirsutum. *Roxb.* citing *Willd.* iv. 829.
Wal-tiedde and Keipisan. *Gært.* ii. *p.* 488. *t.* 180?

Leaves broad-cordate to linear-cordate, downy. Male flowers racemed. Female axillary, solitary. R. *Fl. Ind.* *Germs* three, semi-ovate, one-celled, containing solitary ovules attached to the middle of the inside of the cell. *Drupes* 1—3, nearly round, size of a small pea, marked on the inside near the base with the remaining stigma, smooth, dark purple, full of purple juice. *Nut* solitary, forming nearly a complete ring, with the joining on the inner and underside between the persistent stigma and insertion of the peduncle. *Integuments* three: exterior rugose, consisting of four valves, which fall off spontaneously, exposing the *mediate*, white, rugose, two-valved, nuciform *tunic*, perforated in the middle: inner very thin, adhering to the perisperm. *Perisperm* conform to the seed, of a light brown colour. *Embryo* inverse, annular (as in the *Celosiæ*). *Cotyle-*

dons

dons two, lanceolate. *Radicle* curved, with its apex opposite to the stigma. R. *Carp.*

A common twining species, found in most hedges. Flowers during the wet season.

Calyx three-leaved. *Corol* three-petalled. *Nectary* six-leaved: leaflets linear, emarginate. ♂ *Filaments* six, clubbed, spreading, shorter than the leaves of the nectary. *Anthers* twin, immersed in the fleshy extremities of the filaments. ♀ *Germs* three, seemingly united. *Berries* three, kidney-form, black, very juicy, size of a small pea. *Nut* one-celled. R. *Delin.*

Cocculus *tomentosus. C.*

Menispermum tomentosum. *Roxb. Mss.*

Leaves anteriorly three-lobed, tomentose. *Racemes* axillary. *Corols* expanding. *Nectarial scales* entire. R. *Fl. Ind.*

It is a native of hedges and thickets over Bengal; but by no means common. Flowering-time February and March. Seed ripe in May and June.

Stem twining up and over trees to a great extent (radicant when broken). *Bark* of the older parts ash-coloured, with small scabrous specks; of the young shoots, downy. *Leaves* alternate, petioled, of a roundish cordate shape; anterior margin generally three-lobed; soft and tomentose on both sides, particularly underneath. Length 3—5 or 6 inches, and nearly the same breadth. *Petioles* round, tomentose, nearly as long as the leaves. *Racemes* generally simple, one, two, or more together, from the germs of the axils of the fallen leaves. *Bractes* minute, caducous, many-flowered. *Calyx* three-leaved. *Leaflets* lanceolate, very small. *Corol* three-petalled. *Petals* roundish; first expanding, then recurved; many times larger than the calyx. *Nectary* six-leaved. *Leaflets* or *scales* obovate, oblong, entire: posterior margins incurved over the base of

 the

the filaments. ♂ *Filaments* six, clavate. *Anthers* two-lobed. *Pistil* none. ♀ *Stamina* none, but six fleshy filaments half as long as the nectarial scales. *Germs* three, elevated on a hemispheric receptacle. *Styles* scarce any. *Stigmas* enlarged, ragged. *Drupes* one to three, nearly round, smooth, size of a marrow-fat pea; deep orange. *Seed* solitary, rough, reniform, with a pit on the inside, and a furrowed belt round the exterior or convex side. R. *Delin.*

Cocculus *crispus.*

Menispermum crispum, *Linn.*; tuberculatum var. α, *Lam.*; verrucosum, *Roxb.*

Funis felleus (nec quadrangularis, *Willd.*) *Rumph. Amb.* v. *t.* 44. *f.* 1.

Native of Sumatra, as well as Java and the Moluccas; and Silhet in Bengal. It is employed in medicine, being a powerful tonic: and is most valued for medical purposes by the natives of Bengal, when found a climber on mango-trees; whence its vernacular name *Am-guruch* (qu. *Cocculus mangiferæ*).

Like *Cocculus tomentosus* and *cordifolius*, as well as *malabaricus*, and perhaps other species of the same family, whenever a stem or large branch is divided, being cut or broken, the upper portion sends down a long filiform root to the ground, however distant, and continues to vegetate. The economy of these plants bears in that respect an analogy to the Indian *Ficus.*

Stem perennial, scandent, twining, round, radicant when broken, spongy; with warts scattered over the surface: young shoots smooth. *Bark* yellowish-green. *Cuticle* thin, easily detached. *Leaves* alternate, remote, long-petioled, round-cordate, acuminate, finely pointed, entire, smooth on both surfaces: 7—9-nerved: *lobes* large and rounded. Length 4—6 inches: breadth 3—5. *Petiole* round, smooth, hardly shorter than the leaves.

Male

Male flower: *Racemes* lateral, 1—4 together, simple, round, smooth. *Flowers* in pairs, or three-flowered fascicles, scattered on the raceme; green, inodorous. *Pedicels* slender, divergent. *Bractes* minute, ovate, fleshy, concave; numerous at the base of the raceme, and solitary at the foot of the fascicle. *Perianth* three-leaved: leaflets ovate, minute. *Petals* three, oval, spreading. *Nectary* six-leaved. *Leaflets* cuneate, reflex, inserted on the outside of the filaments near the base. *Filaments* six, filiform, spreading. *Anthers* four-sided.

Female flower on a different plant. *Racemes* lateral, solitary: girt at the base by intricate scales of the germ as bractes. *Flowers* single. *Calyx* and *corol* as in the male. *Nectary* six-leaved: leaflets ovate, inserted at the foot of the rudiments of stamina. *Filaments* six, short, sterile, embracing the receptacle of the germs. *Germs* three, ovate, elevated on a hemispherical receptacle. *Styles* scarce any. *Stigmas* torn. *Drupes* one to three: ovate-globular, smooth, pale-orange, size of an olive, sessile on a fleshy receptacle; one-celled. *Rind* thin, leathery; with the nut attached by a process from within, penetrating the umbilical pit of the putamen. *Pulp* gelatinous, transparent, easily detached from the rind, but closely investing the putamen. *Nut* unequally reniform: the inferior extremity more pointed, long, thin, externally rugged, smooth, white, two-valved; girt by a longitudinal ridge along the suture; with an umbilical pit opening into a reniform pervious recess formed by a duplicature or continuation of a bony putamen. *Seed* solitary, reniform, externally smooth, with an ample orifice opening into a furrowed cavity. *Perisperm* conform to the seed, almond-fleshy, milk-white, one-celled, composed of two concentric laminæ: the inner one excavated, and internally furrowed. *Embryo* shorter than the perisperm, interposed between its laminæ, inverse, curved. *Cotyledons* oval, three-nerved,

nerved, leafy, thin, concave according to the curvature of the perisperm. *Radicle* columnar, short, superior. *C.*

Berries 1—3, size of a common grape, oval, smooth, yellow, succulent, marked with the remains of the style on the apex (whereas on most other species it is on one side); one-celled. *Seed* solitary, reniform; a deep pit on the inside. *Exterior* integument subreniform, white, two-valved; *inner* membranaceous. *Perisperm* conform to the seed, amygdaline. *Embryo* curved, inverse. *Cotyledons* oval, three-nerved, very thin. *Radicle* superior. R. *Carp.*

Cocculus *cordifolius.*

Menispermum cordifolium. *Roxb.* cit. *Willd.* iv. 826.

M. glabrum. *Kœn. Mss.*

Amrita-valli (Cit-amerdu.) *Rheed. Mal.* vii. *t.* 21.

Guduchi s. Guruchi. *Sans.* Gulanch. *Hind.*

Leaves round-cordate, smooth. *Racemes* axillary and lateral.

Most common throughout India.

Root large, soft, spongy. *Stem* twining, perennial, very succulent, extending over the highest trees. *Bark* thick, corky, with many elevated scabrous specks. From the branches frequently drop filiform fibres, which continue lengthening till they reach the ground, where they root. Such have been measured thirty feet long, no thicker than a packthread. *Leaves* alternate, petioled, broad-cordate, five-nerved, entire, waved, smooth: about four inches each way. *Petioles* round, smooth, swoln at the base. *Racemes* axillary, terminal or lateral, with a few scattered flowers in separate axils. *Flowers* numerous, small, yellow. *Calyx* three-leaved: *leaflets* oval. *Corol* three-petalled. *Petals* obovate, many times larger than the calyx. *Nectary* six-leaved. *Leaflets* wedge-form, half the length of the petals; margin inflated, and embracing the filaments.

filaments. ♂ *Filaments* six, clubbed, spreading, rather longer than the leaflets of the nectary. *Anthers* twin, immersed in the fleshy extremities of the filaments. ♀ *Filaments* six, fleshy, sterile. *Germs* three, resting on a tumid receptacle. *Styles* very short. *Stigmas* torn. *Drupes* one, two, or rarely three; size of a small cherry, smooth, red, succulent; pulp very glutinous. *Seed* single, kidney-form: on the inside there is a deep pit, which receives its ligamen. R. *Delin.*

Cocculus *palmatus.*
Menispermum Colomba. *Berry As. Res.* x. 385.
M. palmatum. *Lam.*
Herbaceous, twining, hairy. *Leaves* subrotund, five-lobed: *lobes* acuminate. *Racemes* axillary, compound.

Cocculus *suberosus.* *Decandolle.*
Menispermum Cocculus. *Gært. t.* lxx. *f.* 7.
Perennial, twining, scandent. *Leaves* cordate, base truncate, firm and lucid. R. *Fl. Ind.* *Stem* ligneous, thick as a man's wrist. *Bark* deeply cracked, spongy, ash-coloured: of young shoots, smooth and green. *Leaves* alternate, cordate, entire, smooth on both surfaces; obtuse, emarginate; texture hard; lucid above, paler underneath; four to twelve inches long, three to four broad. R. *Mss.**

Cocculus *hexagynus.* *C.*
Menispermum hexagynum. *Roxb. Mss.*
Twining, villous. *Leaves* parabolic. *Panicles* axillary and terminal. R. *Fl. Ind.*

Native of China, near Canton.

* Since this essay was communicated to the Society, I have learnt that plants have recently flowered in the Botanic Garden at Calcutta; and a description and figure by Dr. Wallich will appear in the Asiatic Researches.

Stem

Stem and *branches* twining to the extent of some fathoms; perennial: tender parts round, and clothed with soft pubescence. *Leaves* alternate, short-petioled, from cordate on the old plants to parabolic on the young; all entire, obtuse, with a minute point; smooth above, somewhat hairy underneath: about an inch and a half long, and one broad. *Panicles* axillary, and terminal on short axillary branchlets composed of alternate, expanding, three-flowered pedicels; villous. *Flowers* small, white. *Bractes* small, ovate, woolly; two larger and smoother press on the calyx. *Calyx* three-leaved. *Leaflets* cordate. *Petals* three, ovate, cordate, twice longer than the calyx. *Nectarial scales* six, nearly linear, shorter than the petals; *apices* divided into two very acute lobes. *Filaments* six, between the nectarial scales and germs: barren. *Germs* six; singly reniform, one-celled, one-seeded. *Styles* undivided, recurvate. *Stigmas* simple. R. *Delin.* ♂ unknown.

Cocculus *triandrus. C.*

Menispermum triandrum. *Roxb. Mss.*

Shrubby, twining. *Leaves* ovate-oblong, pointed, smooth. *Racemes* axillary.

Native of the Malay islands.

Stem consisting of many twining or spreading branches, with smaller flower-bearing branchlets from the base; smooth, deep-green in every part. *Leaves* alternate, short-petioled, ovate-oblong, pointed, entire, smooth on both sides: two to three inches long. *Racemes* axillary, one or more together, rather longer than the petioles. *Flowers* numerous, very minute, yellow. *Calyx* three-leaved, minute. *Corol* urceolate, three-petalled. *Petals* ovate, many times larger than the calyx. *Nectary* six-leaved. *Leaflets* linear-lanceolate, entire, shorter than the petals. *Filaments* three, wedge-shaped, thick and

and fleshy, erect, converging. *Anthers* two pits in the apex of each filament. ♀ Yet unknown.

COCCULUS *laurifolius.* *C.*
Menispermum laurifolium. *Roxb. Mss.*

Arboreous. *Leaves* lanceolar, lucid, entire, three-nerved. *Racemes* axillary and lateral, compound.

Indigenous in Nepal and Srinagar.

Trunk short, soon dividing into many divaricate branches, with extreme branchlets drooping. *Leaves* alternate, short-petioled, lanceolar, entire, firm, polished, three-nerved: 3—6 inches long, 1—1½ broad. *Stipules* none, but a tuft of down in the axils. *Racemes* axillary and lateral, as well as terminal: short, scarcely longer than the petioles. *Calyx* three-leaved. *Leaflets* small, lanceolar. *Petals* three, oval; greatly larger than the calyx. *Nectarial scales* six, obcordate. *Filaments* six, shorter than the petals. R. *Delin.* ♀ Not described.

COSCINIUM.

COSCINIUM *fenestratum.*
Menispermum fenestratum. *Gært. t.* xlvi. *f.* 5.

Native of Ceylon, where it blossoms during November and December. Seed ripe in May and June.

Trunk and *large branches* scandent, stout, thick, ligneous. *Wood* yellow, bitter. *Leaves* alternate, petioled, cordate, entire, 5—7-nerved, smooth and shining above, very hoary underneath, sometimes acuminate, sometimes obtuse. Length 3—9 inches, breadth 2—6. In young plants frequently peltate. *Petioles* shorter than the leaves, round, downy. *Umbellets* or *heads* from the stout, naked, ligneous branches; several from the same bud; on thick, round, downy peduncles of about an inch

inch in length. *Flowers* numerous, subsessile, villous, obscure-green. *Bractes* of the umbellets obscure; of the flowers, three to four, reniform, villous, pressed close to the calyx. *Perianth* three-leaved: *leaflets* oval, small, very downy on the outside, persistent. *Petals* three, ovate-oblong, acute, downy on the outside, much longer than the calyx, persistent. *Filaments* six, small, short, sterile, embracing the base of the pistil. *Germs* three, very downy. *Styles* slender, recurved. *Berries* (*Drupes*) one to three, nearly round, villous, size of a large filbert, one-seeded. *Seed* as represented by Gærtner. ♂ Yet unknown.

The foregoing description was taken from specimens sent by General Hay Macdowal. R. *Delin.*

It is called by the Singalese *Veni-vell-gettah* or *Bang-well-gettah:* in English, the Knotted-plant. It is in repute among the inhabitants of Colombo, who slice it in thin pieces and swallow it, with the liquid, after steeping it in water several hours. They commend it as an excellent stomachic. *Macdowal.*

The General conjectured that it might be the true Colomba-root. In that guess he was mistaken: but it may not improbably possess like medicinal qualities in a less eminent degree. His Singalese name of it is evidently the same with Gærtner's *Wæni wæl.* C.

ANAMIRTA.

Anamirta *paniculata.*

Menispermum heteroclitum. *Roxb. Mss.*

Stem thick, woody, twining or climbing. *Bark* cracked, ash-colour. *Leaves* alternate, petioled, cordate, entire, smooth, deep shining green above, whitish below, 3—5-nerved; with many small distinct tufts of hair upon the nerves on the under-side: 4—6 inches each way. *Petioles* round, smooth, length of

of the leaves. *Panicles* from the naked, woody parts of the stem and large branches beautifully bowing. *Bractes* three-fold, one-flowered, small, caducous.

Male.

Calyx two-leaved: *leaflets* opposite, oval. *Petals* six; three interior and three exterior, equal, oval. *Nectary* none. *Stamens*, a short, thick, central column, supporting an infinite number of anthers in form of a globe.

Female.

The female flowers have not been found.

Berries as in the genus *Menispermum*: about the size of a ripe black-heart cherry; and, as they are collected in very large pendulous branches, their appearance is most inviting, but their taste is most abominable. R. *Delin.*

TILIACORA.

Tiliacora *racemosa.*

Menispermum polycarpon. *Roxb. Mss.*

Bagha-lata. *Hind.* Tilia-kora. *Beng.* Tiga-mashadi. *Teling.*

A large, twining, woody shrub, found on the coast of Coromandel in hedges, and in places overrun with bushes. Flowers most part of the year.

Stem woody, twining to great extent. *Bark* ash-colour. *Leaves* alternate, petioled, cordate, pointed, smooth, shining, and frequently scolloped; about five inches long and three broad. *Racemes* axillary, erect: in the male, frequently compound; in the female, simple, few-flowered. *Bractes* minute, caducous. *Flowers* small, yellow. *Calyx* six-leaved; the three exterior leaflets small. *Petals* three, oblong, many times larger than the calyx, spreading. *Nectary* six-leaved: *leaflets* obcordate, clawed, about the size of the calyx. ♂ *Filaments* six, subulate, erect, alternately shorter, nearly the length

 of

of the corol. *Anthers* ovate. ♀ *Germs* above, about twelve in a circle, each ending in a short, subulate style. *Stigma* simple. *Drupes* or *Berries* many, short-pedicelled, clubbed, smooth, red, about the size of a French-bean. *Nut* one- or two-celled. R. *Delin.*

From the figure as well as the description, it appears that the female flowers exhibit no rudiments of stamina or barren filaments.

REFERENCES TO TAB. VI.

Fig. 1. Cocculus incanus.
2. ——— sepium.
3. ——— crispus.

VIII. *The*

I. Curtis sculp.

VIII. *The Characters of three new Genera of Bats without foliaceous Appendages to the Nose. By William Elford Leach, M.D. F.R.S. and L.S.*

Read February 22, 1820.

VESPERTILIONIDÆ.

Rhinophyllis nullis.

Synopsis Generum.

Gen. 1. CELÆNO.

Dentes incisores $\frac{2}{2}$: *superiores* acuminati, simplices.
inferiores e quatuor columnis efformati.
—— *molares* $\frac{8}{8}$: anterior in utrâque mandibulâ acuminatus; tres postici acutè tuberculati.

Gen. 2. AËLLO.

Dentes incisores $\frac{2}{4}$: *superiores* bifidi.
inferiores æquales, trifidi.
—— *molares* $\frac{8}{12}$: *superiores* duo antici acuminati; tertius bifidus; quartus trifidus.
inferiores tres antici acuminati; tres postici bifidi.

Gen. 3. SCOTOPHILUS.

Dentes incisores $\frac{4}{6}$: *superiores* inæquales: lateralibus brevioribus bifidis.
inferiores subtrifidi.
—— *molares* $\frac{8}{8}$, processibus acuminatis armati.

Gen.

Gen. 1. CELÆNO.

Dentes incisores $\frac{2}{2}$: *superiores* acuminati, simplices.
inferiores æquales, quasi e quatuor columnis aggregatis efformati.

—— *lanarii* $\frac{2}{2}$: *superiores* longiores.

—— *molares* $\frac{8}{8}$: antici in utrâque mandibulâ acuminati, simplices; tres postici processibus acutis armati.

Pedes antici indice 1-articulato: digito medio et quarto triarticulatis; digito quinto 2-articulato.

—— *postici* digitis elongatis subæqualibus: *Ungues* compressi, arcuati, ad basin multo latiores: *Membrana postica* ultra digitorum apices paululum producta: *Suspensorium* unum, rectum, marginale.

Aures distantes: *Auriculæ* minimæ.

*Cauda** 0.

CELÆNO BROOKSIANA.

Habitat ———.

Mus. D. Brookes. ♂.

Dorsum ferrugineum. Venter et Humeri luteo-ferruginei. Aures acuminatæ; margine antico rotundato, postico recto. Membranæ omnes nigræ.

Gen. 2. AËLLO.

Dentes incisores $\frac{2}{4}$: *superiores* compressi, lati, bifidi; laciniis rotundatis.
inferiores æquales, trifidi; laciniis rotundatis.

—— *lanarii* $\frac{2}{2}$: *superiores* longiores, acutissimi, anticè et posticè ad basin processu instructi.
inferiores gradatim acuminati, simplices, tenuiores.

* Membrana postica lineâ subcartilagineâ, mediâ notatur. An Caudæ rudimentum?

Dentes

Dentes molares $\frac{8}{12}$: *superiorum* duo antici triangulatim-acuminati, secundo longiore; tertius externè bifidus; quartus externè trifidus.
inferiorum tres anteriores acuminati, simplices, secundo breviore; tres postici externè bifidi.

Pedes antici indice 1-articulato: digito medio 4-articulato; digitis quarto et quinto 3-articulatis.

—— *postici* digitis mediocribus, æqualibus: *Ungues* compressi, arcuati: *Membrana* ad suspensorii apices producta, recta; hinc ad apicem quasi truncata: *Suspensorium* rectum marginale.

Aures approximatæ, breves, latissimæ: *Auriculæ* nullæ.

Cauda ossea; articulis quinque exsertis, ad membranæ apicem non productis.

Aëllo Cuvieri.

Habitat ———.

Mus. D. Brookes.

Color isabellino-ferrugineus; alæ fuscescente-brunneæ. Aures ad apices excavato-truncatæ.

Amico meo, Cl. G. Cuvier, sit hæc species sacra.

Gen. 3. SCOTOPHILUS.

Dentes incisores $\frac{4}{6}$: *superiores* inæquales, acuminati: intermedii longiores, simplices; laterales æqualiter bifidi.
inferiores obsoletè trifidi.

—— *lanarii* $\frac{2}{2}$: *superiores* longiores, ad latus posticè processu armati.
inferiores ad latus anticè processu armati.

—— *molares* $\frac{8}{8}$, processibus acuminatis armati.

Pedes

Pedes antici indice 1-articulato : digito medio 3-articulato ; digitis quarto et quinto 3-articulatis.

—— *postici* digitis mediocribus, subæqualibus : *Ungues* compressi, arcuati : *Membrana* ad caudæ apicem producta, hinc posticè acuminata : *Suspensorium* flexuosum, in membrana inclusum.

Aures distantes : *Auriculæ* parvæ.

Cauda ad membranæ apicem producta : articulis quinque osseis exsertis.

Scotophilus Kuhlii.

S. ferrugineus, auribus, naso alisque fuscescentibus.

Habitat ———.

Mus. D. Brookes.

Amico meo Henrico Kuhl, M.D. sacra.

IX. *The*

IX. *The Characters of seven Genera of Bats with foliaceous Appendages to the Nose. By William Elford Leach, M.D. F.R.S. and L.S.*

Read March 7, 1820.

I HAVE the pleasure of communicating to the Linnean Society the characters of five genera of the natural family of Bats which have not hitherto been observed by naturalists; and I add the distinguishing marks of VAMPYRUS, a genus lately indicated, but no where characterized, by my friend the Chevalier Geoffroy St. Hillaire, who in a former paper, to which he has referred, had neither described nor figured the *posterior molaris* of the upper jaw*.

The details of MEGADERMA *Geoff.* are also given, not only for the purpose of showing the characters of its grinding teeth and its affinity with NYCTOPHILUS, but to prove that the characters which Cuvier has attributed to that genus, with some degree of doubt, are perfectly correct (*Règne Anim.* i. 127.), namely, the absence of the superior incisors.

On a future occasion it is my intention to lay before the Society the details of all such new genera as may be discovered by my friends in different parts of the world, which shall be followed with descriptions of all the species.

To further my purpose, I solicit the aid of travelling naturalists, and request them to have the goodness to send me specimens of Bats (preserved if possible in spirits) from every part of the world.

* *Annal. de Mus.* xv. 184. *pl.* 2.

VESPER-

VESPERTILIONIDÆ.

Rhinophyllis instructæ.

Stirpium et Generum Synopsis.

Stirps 1. *Pedes antici indice* 1-*articulato*; *digito medio* 4-*articulato*; *digitis quarto et quinto triarticulatis. Aures distantes, mediocres, auriculâ instructæ.*

Gen. 1. ARTIBEUS.

Dentes incisores $\frac{4}{4}$: *superiores* inæquales: duo medii longiores bifidi.
inferiores subæquales, truncati: duo medii anticè canaliculati.
——— *molares* $\frac{8}{10}$: *inferiorum* posterior minutus.

Gen. 2. MONOPHYLLUS.

Dentes incisores $\frac{4}{0}$: *superiores* inæquales: duo medii longiores bifidi; exteriores externè truncati.
——— *molares* $\frac{10}{12}$: *superiorum* duo antici distantes, trifidi: reliqui tuberculati.
inferiorum tres antici trifidi; reliqui tuberculati.

Stirps 2. *Pedes antici indice biarticulato*; *digito medio* 4-*articulato*; *digitis quarto et quinto triarticulatis. Aures magnæ approximatæ, auriculâ instructæ.*

Gen. 3. MORMOOPS.

Dentes incisores $\frac{4}{4}$: *superiores* inæquales: medii lati emarginati; exteriores minimi obliquè acuminati, acuti.
inferiores æquales, trifidi.
——— *molares* $\frac{10}{12}$.

Stirps 3. *Pedes antici indice* 1-*articulato*; *digitis medio, quarto et quinto* 3-*articulatis. Aures magnæ coalitæ, auriculâ instructæ.*

Gen. 4. NYCTOPHILUS.

Dentes incisores $\frac{2}{6}$: *superiores* conici.
inferiores æquales, trifidi.
——— *molares* $\frac{8}{8}$: *superiorum* primus acutus: secundus et tertius 4-fidi; quartus trifidus.
inferiorum primus conicus; secundus, tertius et quartus tuberculati.

Gen. 5. MEGADERMA.

Dentes incisores $\frac{0}{4}$: *inferiores* æquales trifidi.
——— *molares* $\frac{8}{10}$: *superiorum* primus acuminatus: cæteri tuberculati.
inferiorum primus et secundus acuminati; cæteri acutè tuberculati.

Stirps 4. *Pedes antici indice biarticulato*; *digito medio* 4-*articulato*; *digitis quarto et quinto triarticulatis. Aures distantes, auriculâ instructæ.*

Gen. 6. VAMPYRUS.

Dentes incisores $\frac{4}{4}$: *superiores* medii longiores, externè truncati; exteriores brevissimi obtusi.
inferiores æquales, obtusi.
——— *molares* $\frac{10}{12}$.

Gen. 7. MADATÆUS.

Dentes incisores $\frac{4}{4}$: *superiores* medii longiores, bifidi; exteriores brevissimi obtusi.
inferiores æquales, acuti.
——— *molares* $\frac{8}{10}$.

Gen. 1.

Gen. 1. ARTIBEUS.

Dentes incisores $\frac{4}{4}$: *superiores* medii bifidi; exteriores truncati breves.
inferiores truncati; duo medii sublongiores, anticè canaliculati.

—— *lanarii* $\frac{2}{2}$: *superiores* majores; ad basin internè marginati, posticè dilatati.

—— *molares* $\frac{8}{10}$: *superiores* ad basin internè dilatati; primus minor; tertius major.
inferiorum primus et secundus externè acuminati; secundo longiore; tertius et quartus latiores, internè tuberculati; quintus minutissimus.

Rhinophylli 2: uno horizontali; altero verticali.

Pedes postici suspensorio uno, brevi, recto, marginali.

Cauda nulla.

Artibeus Jamaicensis.

Habitat in Jamaica.

Mus. Brookes, nost.

Supra fuscescenti-brunneus, subtus murinus. Aures, rhinophylli et membranæ omnes fuscescentes.

Aures rotundatæ. Rhinophyllus horizontalis subundulatus; verticalis acuminatus, anticè utrinque lineâ impressa notatus. Membrana postica usque ad basin ferè emarginata.

Cranium latiusculum, facie vix latius. Facies obtusa.

Gen. 2. MONOPHYLLUS.

Dentes incisores $\frac{4}{0}$: *superiores* inæquales: duo medii longiores, bifidi; exteriores teretes, externè truncati et ad basin dilatati.

Dentes lanarii $\frac{2}{2}$: *superiores* ad basin anticè et posticè dilatati.
inferiores internè ad basin marginati; margine posticè dilatato.

—— *molares* $\frac{10}{12}$: *superiorum* duo antici distantes, trifidi; cæteri externè et internè tuberculati.
superiorum tres antici trifidi (secundus et tertius distantes); cæteri externè et internè tuberculati.

Rhinophyllus 1 erectus.

Pedes postici suspensorio uno marginali.

Cauda brevis.

MONOPHYLLUS REDMANI.

Habitat in Jamaica.

Mus. nost. Communicavit Dom. R. S. Redman.

Color supra fuscus, subtus murinus. Membranæ omnes, Aures et Rhinophyllus fuscus.

Rhinophyllus acutus albido-villosus. Aures rotundatæ. Barba elongata.

Cranium facie paulo latius. Facies elongata.

Gen. 3. MORMOOPS.

Dentes incisores $\frac{4}{4}$: *superiores* inæquales: medii latè-emarginati; laterales minimi, obliquè acuminati, acuti.
inferiores æquales trifidi; laciniis rotundatis.

—— *lanarii* $\frac{2}{2}$: *superiores* duplo longiores, subcompressi, anticè canaliculati, ad basin internè dilatati.
inferiores ad basin externè et internè dilatati.

Dentes

J. Curtis del. et sculp.

Mormoops Blainvillii.

Dentes molares $\frac{10}{12}$: *superiorum* anterior parvus, acutus, ad basin externè, et posticè internè dilatatus; tertius, quartus et quintus ad basin internè tuberculato-dilatati (tertio et quarto externè 3-mammillatis, internè excavato-bidentatis); quintus externè 1-mammillatus, internè excavato-bidentatus.

inferiorum tres antici acuti, compressi, externè dilatati (secundo breviore; primo et tertio æqualibus); quartus, quintus et sextus sublongiores, externè ad basin dilatati, supernè excavato-5-dentati.

Rhinophyllus 1 erectus, cum auribus confluens.

Pedes postici suspensorio uno, recto, marginali.

Cauda ad membranæ posticæ apicem non producta; articulo ultimo libero.

Caput fronte abruptè elevato. *Labium superius* lobatum, medio crenatum; inferius in membranam trilobam productum, ad medium processu carnoso, diadema referente, instructum. *Mentum* utrinque in membranam dilatatum; membranis cum auribus connexis. *Lingua* papillis omnibus retrorsum reflexis; anterioribus bifidis; posterioribus majoribus multifidis. *Palatum* transversim elevatum; jugis posterioribus undatis.

Cranium facie abruptè efformata. *Ossa nasalia* inter maxillaria immersa. *Os inter-parietale* cum parietalibus lateralibus non coalitum.

Mormoops Blainvillii.

Tab. VII.

Habitat in Jamaica. Dom. Lewis.
Mus. D. Brookes.

Rhinophyllus

Rhinophyllus plicatus. Aures supernè bilobæ. Processus labialis diadematiformis, et nasus irregulariter tuberculati.

Amico meo Henrico de Blainville sit hæc species sacra.

Gen. 4. NYCTOPHILUS.

Dentes incisores $\frac{2}{6}$: *superiores* elongati, conici, acuti.
inferiores æquales, trifidi; laciniis rotundatis.

—— *lanarii* $\frac{2}{2}$: elongati, conici.
superiores simplices.
inferiores posticè processu acuto armati.

—— *molares* $\frac{8}{8}$: *superiorum* anticus acutus, posticè 1-tuberculatus; secundus et tertius 4-tuberculati; quartus 3-tuberculatus.
inferiorum anticus acutus, simplex, conicus; secundus, tertius et quartus tuberculati.

Rhinophylli duo erecti; posteriore longiore.

Pedes postici suspensorio uno, recto, marginali.

Cauda ossea (articulis quinque exsertis) ad membranæ apicem producta.

Nyctophilus Geoffroyi.

Habitat ———.

Mus. D. Brookes.

Dorsum lutescente-fuscum. Venter, Pectus et Gula sordidè albidæ. Aures latæ, mediocres. Membranæ fuscescente-nigræ. Cauda acuminata.

Amico meo Geoffroy St. Hillaire sacra.

Gen. 5. MEGADERMA*.

Megaderma, *Geoffroy*, *Cuvier*.

Dentes incisores $\frac{0}{4}$: *inferiores* trifidi, æquales; laciniis rotundatis.

* Os intermaxillare cartilagineum, molle.

Dentes

Dentes lanarii $\frac{2}{2}$: *superiores* longiores, ad basin anticè et posticè acuminato-producti.

—— *molares* $\frac{8}{10}$: *superiorum* anticus acuminatus, longior, ad basin internè dilatatus, marginatus; cæteri angulati, tuberculati; secundus et tertius ad basin posticè dilatati.

inferiorum duo antici acuminati, ad basin dilatati (primo breviore); reliqui acuminato-tuberculati, ad basin externè marginati: tuberculis exterioribus.

Rhinophylli duo confluentes; uno horizontali, altero verticali.

Pedes postici suspensorio uno, recto, marginali.

Cauda nulla.

Megaderma Frons.

M. rhinophyllo anteriore dilatato, auriculis elongatis acuminatis, internè ad basin lobatis; lobo simplici.

Feuille. *Daub. Acad. des Sc.* (1759) 374.

Megaderma Frons. *Geoff. St. Hill. Ann. du Mus.* xv. 192.

Habitat in Africa, apud Senegal et Cape Coast.

Mus. Brookes, nost.

Membrana postica rotundato-emarginata. Caput parvum. Cranium rotundatum. Facies cranio angustior, obtusa.

Gen. 6. VAMPYRUS.

Vampire, *Geoffroy St. Hillaire.*

Dentes incisores $\frac{4}{4}$: *superiores* medii internè longiores; exteriores brevissimi obtusi.

inferiores æquales, ad apicem excavati; exteriores ante medios inserti.

—— *lanarii* $\frac{2}{2}$: *superiores* subtenuiores, paululum breviores, ad basin posticè internè dilatati.

inferiores

*inferiores*释internè versus basin abruptè dilatati; parte dilatata usque ad molarem anticum producta.

Dentes molares $\frac{10}{12}$: *superiorum*, anterior acuminatus posticè declivis et paulului productus; secundus longior acuminatus, ad basin anticè et internè posticè dilatatus; tertius et quartus externè excavati, internè laciniis duabus acuminatis (hôc anticè processu obtuso); quintus angustissimus obtusè trifidus; lacinia interiore breviore.

—— —— *inferiorum* anterior et secundus internè excavati; hôc acutiore; tertius acuminatus posticè ad basin subproductus; quartus et quintus majores longiores 5-fidi; sextus trifidus.

Rhinophylli 2 confluentes; uno erecto, altero horizontali.

Caput facie gradatim efformatâ. *Labias* implicia. *Lingua* papillis omnibus retrorsum reflexis; anterioribus mediis distinctè, posterioribus nonnullis obsoletissimè bifidis.

Spec. 1. Vampyrus Spectrum.

Phyllostoma Spectrum. *Geoff. St. Hillaire Ann. du Mus.* xv. 174. *pl.* 2.

Vespertilio Spectrum. *Linn. Syst. Nat.* xii. i. 46.

Membrana postica posticè ad medium rotundato-emarginata.

Gen.

Gen. 7. MADATÆUS.

Dentes incisores $\frac{4}{4}$: *superiores* inæquales; duo medii longiores bifidi, laciniis obtusis; laterales brevissimi obtusi.

inferiores æquales, simplices, acuti.

—— *lanarii* $\frac{2}{2}$: *superiores* longiores et latiores.

—— *molares* $\frac{8}{10}$: *superiores* dente anteriore parvo acuto posticè declivi, ad basin internè subdilatato; secundo longiore acuto, anticè acuto posticè subdeclivi ad basin internè dilatato, processu obtusiusculo armato; tertio et quarto externè bifidis, laciniis obtusiusculis, ad bases internè valde dilatatis, bituberculatis; dente quarto tertio breviore, laciniâ externâ posticâ breviore.

—— —— *inferiores* dente anteriore equaliter acuminato obtusiusculo; secundo longiore internè canaliculato posticè ad basin dilatato; tertio internè et externè laciniis quatuor obtusis; quarto internè laciniis tribus, internè laciniâ unâ anticâ instructo; quinto minimo trituberculato.

Rhinophylli 2: uno verticali; altero lunato horizontali.

Pedes postici suspensoriis duobus brevissimis instructi: *digiti* æquales: *ungues* parvi compressi.

Cauda 0.

Labia papillis mollibus compressis fimbriata. *Lingua* anticè filamentis compressis bifidis posticè spectantibus instructa; perpaucis ad apicem linguæ majoribus: lingua pone medium tuberculis 2—5-fidis antrorsum spectantibus, et posticè

ticè tuberculis duobus ovatis in fossulis positis instructa. *Palatum* anticè longitudinaliter elevatum, lateribus posticè tuberculis antrorsum spectantibus armatis.

MADATÆUS LEWISII.

Habitat in Jamaica. D. Lewis.

Mus. D. Brookes.

Rhinophyllus verticalis acuminatus, marginibus abruptè attenuatis integris ad apicem non attingentibus, hinc hastiformis. Aures acuminato-rotundatæ, mediocres.

Color nigricans. Dentes transversim striolati. Membrana postica acutè emarginata.

Expansio alarum 17 pol.

X. *On*

X. *On two new British Species of Mytilus, in a Letter to the Rev. E. J. Burrow, F.R.S. and L.S. By the Rev. Revett Sheppard, F.L.S.*

Read January 18, 1820.

Dear Sir,

The publication of the Transactions of the Linnean Society has been attended with great benefit to the concerns of natural history. Many important discoveries are there registered which would not otherwise have become generally known; and every new discovery adds a fresh link to a chain of wonders, which ought to inspire us with admiration of Him, who by a word called them into existence. Nothing of this kind should be lost; wherefore I am now desirous of transmitting, by your hands, to the Society an account of two new species of British Fresh-water *Mytili.*

So great has been the influx of new species within a few years, that the existence of a necessity for making alterations in the characters of such subjects as have been described by Linnæus, must be readily allowed by all. Doubtless that great man would have done so himself, had he been in the vigour of life at this time; or he would have had the mortification of seeing his works rendered of little utility, owing to the inconvenience of the characters given to one species often answering to several others. Thus, *Mytilus cygneus*, *M. incrassatus*, *M. anatinus*, and *M. Macula*, I consider as distinct species: yet Linnæus's specific character of *M. anatinus* will answer to them all. He adds indeed to his character of *M. cygneus*, "*cardine laterali,*" which he does

 not

not notice in that of *M. anatinus*; but the hinge in the first species is scarcely more lateral than in the last, and not so much as in my *M. incrassatus*. In the *M. anatinus*, he speaks of the umbones as being decorticated; but mentions not that circumstance in his description of the *M. cygneus*; thereby leading us to suppose that they are not so in that shell; whereas, the four species have their umbones decorticated,—in a greater degree, indeed, in the *M. anatinus* than in the rest.

With respect to the accompanying plate, indifferent as it is, it may be useful for determining the species by bringing them into one point of view. The outlines are the size of specimens in my collection; and the shells having been laid on the paper and their circumferences taken, their exactness may be depended upon.

1. Mytilus cygneus.

M. testa ovata, anterius compressiuscula, fragilissima, margine membranaceo, umbonibus decorticatis, anticâ baseos adscendente.

Tab. V. Fig. 3.

Habitat in rivis et stagnis.
Long. 2 poll. 7½ lin. Lat. 5 poll.

On this species and *M. anatinus* I need not enlarge, they being so well described by Dr. Maton and Mr. Rackett in their admirable paper upon the British *Testacea*. I shall only observe, that what was omitted by Linnæus has been unnoticed by them, viz. that the margin of *M. cygneus* is membranaceous, though not in so great a degree as that of *M. anatinus*; and that its umbones are decorticated. It arrives at a much greater size than the one figured, or than the largest specimens of *M. anatinus*.

2. Mytilus

2. Mytilus incrassatus.

M. testa ovali, anterius compressiuscula, margine membranaceo, umbonibus decorticatis, posterius ab umbonibus versus basin gradatim incrassata, ligamento valde exserto.

Tab. V. Fig. 4.

Habitat in rivis.

Long. 2 poll. 5 lin. Lat. 4 poll. 2½ lin.

A very distinct species; rough and dark-coloured on the outside, thicker and stronger than the rest; the hinge towards the posterior extremity. Remarkable for its large exserted ligament; and posterior part, in a slope from the umbones to the base, being much incrassated, which gives that part in the inside a white milky appearance; whereas the rest is of a fine pearly hue.

In the river Trent at Holme, near Newark, Nottinghamshire.

The variety of *M. cygneus*, given by Dr. Maton and Mr. Rackett, ought perhaps to be considered a variety of this species.

3. Mytilus anatinus.

M. testa ovali, anterius compressiuscula, fragilissima, margine membranaceo, umbonibus decorticatis, areâ anticâ basique parallelis.

Tab. V. Fig. 5.

Habitat in aquis dulcibus.

Long. 3 poll. ¾ lin. Lat. 6 poll. 7½ lin.

The shells of *M. anatinus*, when they grow to a large size, are proportionably as ventricose as those of *M. cygneus*. My specimen, the outline of which accompanies this paper, I took many years since from the pond in the garden of my revered friend the Rev. William Kirby of Barham.

4. Mytilus

4. Mytilus Macula.

M. testa ovali, anterius compressiuscula, fragilissima, margine membranaceo, umbonibus decorticatis, areâ anticâ ad angulum adscendente.

Tab. V. Fig. 6.

Habitat in stagnis.

Long. 1 poll. $5\frac{1}{2}$ lin. Lat. 2 poll. $5\frac{3}{4}$ lin.

A smooth, thin, fragile shell. The hinge towards the posterior extremity. Its particular character arises from the anterior area being sloped upwards, so as to form an angle with the forepart of the shell; this, with the large purple blotch (which, however, may be removed by rubbing with a brush), and which in some specimens occupies two-thirds of the outer superficies (and whence its name), stamps it as a distinct species. In the inside the umbones and a small space around them are buff-colour; the rest blue, mingled however with green at the forepart of the shell.

Some specimens exceed in size the one figured; the largest I have obtained is 1 inch $7\frac{1}{2}$ lines in length, by 2 inches 11 lines in breadth.

They are in vast abundance in the canals in the garden at Campsey Ash, the seat of my eldest brother.

As I have determined the characteristic of *M. anatinus* to be the *anterior slope running parallel with the base*, perhaps it would be as well to consider what is given as a variety of that species in the Linnean Transactions to be a variety of *M. Macula.*

To bring the specific differences above enumerated into one point of view, *Mytilus anatinus* is distinguished from *M. cygneus* by its anterior area running parallel with its base; and again, from *M. Macula* by the anterior area in the latter sloping upwards,

wards, and forming an angle with the forepart of the shell. In *M. cygneus* the base slopes upwards; and the *M. incrassatus* differs from them all by its large exserted ligament, superior roughness on the outside, and in having the posterior part in a slope from the umbones to the base incrassated.

I am, &c.

Wrabness Parsonage, Essex,
Dec. 18, 1819.

REVETT SHEPPARD.

XI. *Obser-*

XI. *Observations on the natural Group of Plants called* Pomaceæ. *By Mr. John Lindley, F.L.S.*

Read April 4 *and* 18, 1820.

The natural group of plants comprehended in the first section of Jussieu's *Rosaceæ* has, on account of its near affinity to *Rosa*, lately occupied much of my attention; and as an apparent uniformity in the structure of its genera has been the cause of much dispute respecting their limits, an attempt to ascertain these with something like precision may not perhaps be unacceptable to the Society.

Linnæus admitted but four genera, *Cratægus*, *Sorbus*, *Mespilus*, and *Pyrus*; from which Jussieu distinguishes *Malus* and *Cydonia*. Medicus, in his "*Geschichte der Botanik unserer zeiten*," published in 1793, out of these formed eleven, in which he has been partially followed by Borkhausen and Mönch. His genera are unfortunately by no means natural; and the characters upon which they are founded have been considered unimportant by most botanists, who have therefore adopted the genera of either Jussieu or Linnæus. Sir James Smith, aware of the uncertainty in number of styles by which those of the latter have been principally distinguished, has in *Flora Britannica* and Rees's *Cyclopædia* (article *Mespilus*) reduced all the genera to two; characterizing *Pyrus*, to which he refers *Cydonia* and *Sorbus*, by the thin texture of its endocarp, and *Mespilus*, including *Cratægus*, by the osseous substance of the same part, or, as he, following Linnæus, expresses it, by its berry.

But

But in an order so strictly natural as this is, greater difficulty is always to be expected in finding characters for genera, than in those of which our knowledge is more imperfect, and whose series of individuals may therefore be considered less complete. There also appear to be some important modifications of structure to which the attention of botanists has not hitherto been directed; and they promise to afford better distinctions than have yet been employed.

The form of leaves has usually been considered a mark by which certain genera might be distinguished. Sir James Smith has however justly pointed out the general insufficiency of these differences even in their most decided form. Thus *Sorbus* with pinnated leaves differs in scarcely any other respect from *Pyrus*, where they are simple. Nor can the *Cratægi* with angular leaves be distinguished from such as have a regular outline. Yet, entire and serrated leaves are almost certain indications of different genera; *Photinia integrifolia* offering the only instance to the contrary. And the fruit of this, which has not yet been seen, may determine it to be a genus distinct from that to which I have referred it.

Bracteæ are generally subulate, quickly withering and falling off. In *Mespilus* they adhere to the tube of the calyx; and in *Raphiolepis* are persistent and leafy.

Inflorescence can rarely be employed even as a secondary character; for in *Pyrus* we have all the gradations from a nearly simple to a very compound form. Nevertheless, the nearly sessile flowers of *Mespilus* distinguish it from *Eriobotrya* and *Cratægus*. The great terminal bunches of *Photinia* are very unlike the lateral flowers of the last genus. The scaly racemes of *Raphiolepis* and the naked axillary ones of *Chamæmeles* are peculiar to themselves.

The limb of the calyx is usually cup-shaped and persistent;

 but

but not much thickened. In *Raphiolepis* it is infundibuliform and deciduous; in *Chænomeles* campanulate and fleshy. It is generally five-toothed; in *Cydonia* and *Mespilus* five-parted and foliaceous; in *Chamæmeles* as it were truncate, with five very small denticulations.

The petals are roundish and spreading; in *Amelanchier* long and narrow; in *Cotoneaster* short and erect; in *Photinia* reflexed.

The fruit is usually closed by the thickened disk and connivent divisions of the calyx. But in *Mespilus* the top of the cells is absolutely naked; and this is one of the distinctions between it and *Cratægus*. In *Chænomeles* it splits into five valves, according to Thunberg. In its young state it is composed of from one to five ovaria, usually united into a single mass and adhering to the calyx, which then appears superior; but in *Cotoneaster* the ovaria are absolutely distinct from each other, and only cohere with the calyx; in *Photinia* they are united with each other, but not with the calyx, except by somewhat less than their lower half. As the fruit ripens, the calyx and ovaria increase simultaneously in size. The substance of the latter, however, varies considerably. They become fleshy, and form with the calyx a five-celled fruit, with cartilaginous or chartaceous endocarp in *Pyrus*, and osseous endocarp in *Mespilus*; and to these the term *pomum* may be strictly applied. Linnæus and his followers have considered the fruit of *Mespilus*, &c. as a *bacca*; but if this is a term by which those fruits are distinguished whose seeds are lodged in pulp, and usually lose their point of attachment when ripe, it can only have been used in this order through a very common mistake of the part containing for the part contained; or, in other words, of the inner coat or putamen of the cells for the seeds themselves. In *Cotoneaster* I have already said, that the ovaria are parietal; and the ripe fruit consists of five pericarpia

carpia attached to the side of the fleshy calyx. *Photinia* has a little bilocular capsule inclosed in the fleshy calyx.

The cells of the ovarium in *Amelanchier* are completely divided in two by a dissepiment, which is quickly obliterated by the growth of the ovula; so that the ripe fruit does not differ in this respect from the rest of the order. Nor indeed is the ovarium so materially dissimilar as would at first sight appear; since its cells are made bilocular by a spurious dissepiment, having a different origin from that of plurilocular fruit in general, inasmuch as it is opposite to the style and not alternate with it. It is not connected with any corresponding increase in the number of styles, either apparent or hypothetical; nor can it be considered an extension of the placenta, as are the false septa of many fruits. On the contrary, it originates from the axis of the back of the cell, as is proved by *Pyrus arbutifolia* and *Photinia integrifolia*, in which it is rudimentary only. It, therefore, is probably analogous to the partial dissepiment of certain *Malvaceæ*, such as *Thespesia populnea*.

The *direction* of seeds is usually ascending. In *Cratægus Oxyacantha*, and those species more immediately connected with it, the seeds are peltate; and by this character I have formerly proposed to distinguish *Cratægus* from *Mespilus*. But in some other species, such as *C. glandulosa* and *pyrifolia*, I have since observed the usual direction of the order to exist. In *Chamæmeles*, in which the ovarium is simple, the ovula are absolutely erect.

The *number* of seeds in the chief part of the order is two, or one by the abortion of the other. In *Cydonia* and *Chænomeles* their number is indefinite. In *Osteomeles* they are solitary in their youngest state.

The testa, in all the genera with osseous endocarp, is membranaceous; but in *Pyrus* it is cartilaginous; and in *Raphiolepis*

 coriaceous;

coriaceous; so that the thinner the lining of the cells is, the thicker becomes the coat of the seeds; as if some sort of powerful covering were indispensable for the protection of the embryo, and therefore supplied by the testa when the pericarpium is insufficient.

The chalaza is generally conspicuous, in the form of a somewhat depressed areola, situated at that end of the seed which is next the hilum. Its presence proves the coriaceous envelope of the abortive seeds of *Raphiolepis* to be testa and not endocarp.

The embryo has the same form as the seed, in consequence of the almost absolute absence of albumen, which only exists in the form of a very thin scale adhering to the testa in certain species of *Pyrus*. The *cotyledons* are flat, and parallel with the placenta; the *radicula* small and conical, obliquely turned towards the hilum; somewhat longer in the pinnated *Pyri* than in the rest of that genus.

Three-fourths of the species are found in the temperate regions of Europe, North America, and Asia; a few are peculiar to the north of India, and one species comes from the Sandwich islands. They would therefore have nearly the same geographical distribution as Roses. But two species have been found in Peru by Ruiz and Pavon; and a *Pyrus* from Mexico, sent to this country by M. Pavon, exists in the herbarium of Mr. Lambert. It is much to be regretted that we have no information of the altitude at which these southern species were observed.

We have only now to consider whether the foregoing genera should be retained as a distinct natural order, as has been proposed by M. Richard (see *Analyse du Fruit*, Eng. edit. p. 23), or be understood only as a section of *Rosaceæ*, according to the decision of M. de Jussieu.

The principal peculiarity by which M. Richard proposes to characterize *Pomaceæ* appears to be the ascending direction of

their

their seeds, as opposed to the suspended seeds of most true *Rosaceæ* (Nestler's *Potentilleæ*). But whatever may be the value of this distinction in other instances, it must in the present family be considered of generic importance only: for *Dryas*, *Waldsteinia* and *Geum*, with all the habit and other characters of *Rosaceæ*, have seeds with the same direction as *Pomaceæ*; and certain *Cratægi* with angular leaves exhibit a passage from one to the other. Nor can the inferior fruit of *Pomaceæ* distinguish them from *Rosaceæ* with more certainty than the direction of their seeds, as is manifest from the structure of certain genera I shall presently have occasion to propose. It is true that *Pyrus*, *Mespilus*, and some others, have fruit absolutely inferior, or cohering with the calyx and each other by their whole surface; but in *Cotoneaster* this cohesion is very partial, and in true *Photiniæ* scarcely exists in any degree. There is however one circumstance which is universal in *Pomaceæ*, and I believe does not exist in *Rosaceæ*; namely, that the ovula of the former are collateral, and of the latter, when more than one, vertical, or placed one above the other. This character may therefore be employed to distinguish *Pomaceæ* as a section from *Rosaceæ*, but can scarcely be sufficient to separate it as an order; especially as the same disposition of ovula, when reduced to a single pair, exists in *Spiræa*.

ROSACEARUM sectio prima *Juss.*

(POMACEÆ *Richard Anal. du Fr.* ed. Angl. 23.)

Hinc Myrtaceis baccatis, mediantibus Chœnomele et Cydonia pariter polyspermis, affinis; inde Rosaceis cæteris per Cratægos semine peltato.

CHARACTER

CHARACTER NATURALIS.

Arbores fruticesve.

Rami alterni, glabri v. pubescentes, laterales sæpe aphylli spiniformes.

Folia stipulata, alterna, simplicia v. composita, margine incisa v. integerrima, decidua v. persistentia, glaberrima v. (sæpius subtus) lanata. *Stipulæ* deciduæ, liberæ, v. paululum adnatæ.

Inflorescentia terminalis, in racemum v. cymam multifloram, quandoque abortu unifloram, congesta; v. axillaris; nunc nuda, nunc bracteis floribus longioribus et persistentibus squamosa. *Bracteæ* sæpius subulatæ, sphacelatæ, deciduæ.

Flores hermaphroditi, rarissimè polygami. *Calyx* campanulatus, maturitate carnosus; limbo 5-partito v. dentato, sæpius persistente, modò deciduo; *tubo* cum ovariis cohærente v. semilibero. *Petala* 5, unguiculata, æstivatione quinconciali, fauce calycis inserta, eoque plerumque longiora, decidua.

Stamina definita v. indefinita, æstivatione inflexa, modò alternatim inæqualia, disco serie simplici raró duplici inserta, patentia v. erecta, raró dentibus calycinis breviora. *Filamenta* subulata, v. rariùs filiformia, distincta. *Antheræ* subrotundæ, anticæ, incumbentes, 2-loculares, longitudinaliter dehiscentes. *Pollen* sphæricum.

Discus sæpius carnosus, mellifluus, raro tenuissimus; nunc hypopetalus, nunc per parietem limbi calycis extensus.

Ovaria apice sæpius villosa; nunc parietalia, discreta, unilocularia, facie hirsuta, nunc villosa, connata, calyce semidiscreta; vel calyce et invicem coadunata, loculis tum quandoque septo spurio divisis; *ovula* collateralia.

Styli simplices, numero ovariorum, filiformes, staminum longitudine, v. rariùs brevissimi lana ovarii obvoluti; discreti v. partìm

partìm connati, nudi v. infra medium lanam gerentes. *Stigmata* plerumque emarginata, nunc plana simplicissima.

Fructus calyce baccato inclusus; nunc *pomum* 1—5-loculare, endocarpio* cartilagineo ceu osseo, raró siccum? quinquevalve; nunc achenopses uniloculares, parietales, facie sæpiùs hirsutæ; vel pericarpium pilosum, biloculare, semisuperum. *Loculi* quandoque dissepimento spurio ex axe dorsi enato divisi.

Semina oblonga v. subglobosa, hinc planiuscula, basi acuta; plurilocularibus ascendentia, collateralia, definita v. indefinita; uniloculari erecta. *Testa* membranacea, endocarpio tum osseo; v. cartilaginea, v. mucosa, v. coriacea. *Hilum* conspicuum lineare. *Rapha* simplex, rectilinea. *Chalaza* apicilaris; sæpe obscure colorata, conspicua.

Embryo albus, exalbuminosus, semini conformis. *Cotyledones* planæ, ovales, carnosæ, placentâ parallelæ. *Radicula* infera, ad hilum versa, conica.

* For the explanation of this and other carpological terms, *vide* Richard on the Structure of Fruits and Seeds, Eng. edition.

GENERUM

GENERUM ANALYSIS.

Endocarpium cartilagineum.
 Semina indefinita.
  Pomum 5-valve . . . . *Chænomeles* (I.)
  Pomum clausum . . . . *Cydonia* (II.)
 Semina definita.
  Ovula solitaria (ob loculos 2-partitos) . *Amelanchier* (VI.)
  Ovula gemina.
   Ovarium uniloculare . . . . . . *Chamæmeles* (X.)
   Ovarium bi- triloculare.
    Calycis limbus infundibuliformis, deciduus . . . . *Raphiolepis* (XI.)
    Calycis limbus altè divisus persistens.
     Pomum.
      Seminis membrana propria chalazâ insignita . . . *Pyrus* (III.)
      Seminis membrana propria obliterata . . . . . *Eriobotrya* (VIII.)
     Pericarpium semisuperum, biloculare . . . . *Photinia* (IX.)
Endocarpium osseum.
 Pomum apertum. Sepala persistentia . . *Mespilus* (V.)
 Pomum clausum.
  Styli glabri . . . . *Cratægus* (XII.)
  Styli infra medium barbati exserti. Ovula solitaria . . . . *Osteomeles* (IV.)
Achenopses parietales . . . . *Cotoneaster* (VII.)

I. CHŒNO-

I. CHŒNOMELES.

Pyri species *Thunb. Willd.*

Cal. campanulatus, 5-dentatus, carnosus. *Stamina* erecta, serie duplici inserta. *Pomum* quinquevalve, polyspermum.

Frutex (*Japoniæ*). Folia *lucida, coriacea, crenata.* Flores *terminales, coccinei.*

Pyrus Japonica *Thunb.*

The fruit is only known from Thunberg's description, who says it splits into five valves. The insertion of the stamens in a double series, and the great fleshy persistent limb of the calyx, are alone sufficient to distinguish it from *Cydonia*.

II. CYDONIA.

Cydonia *Tourn., Juss.* Pyri Sp. *Linn.*

Cal. 5-partitus: laciniis foliaceis. *Pomum* clausum, polyspermum. *Semina* testa mucilaginea.

Arbor *mediocris* (*Europæ* et *Japoniæ*). Folia *integerrima, subtus lanata.* Flores *solitarii, subsessiles.* Bracteæ *sæpius solitariæ, foliaceæ.* Calyx *lanatus.* Petala *magna, conspicua.* Styli *infra medium lana densa cohærentes.*

Pyrus Cydonia *Linn.*

III. PYRUS.

Pyrus *Tourn., Linn., Juss.* Malus *Juss.* Lazarolus, Hahnia, Aucuparia, *Medic.* Sorbus *Linn.* Aroniæ pars *Pers.*

Cal. 5-dentatus. *Petala* subrotunda. *Pomum* clausum, 5-loculare, putamine cartilagineo. *Loculi* dispermi. *Testa* cartilaginea.

Arbores v. arbusculæ (*Europæ, Asiæ* et *Americæ septentrionalis*). Folia *simplicia v. composita, serrata.* Cymæ *patentes, terminales, multifloræ.* Bracteæ *subulatæ, deciduæ.* Petala *subrotunda, patentia, v. erecta, tum concava, conniventia.* Styli *glabri v. basi lanati, liberi v. partim cohærentes.*

 1. Folia

1. Folia simplicia.

Pyrus communis, pollveria, nivalis, Malus, dioica, spectabilis, prunifolia, baccata, coronaria, angustifolia, salicifolia, Aria, intermedia, *Willd.*; elæagrifolia, *Pall.*; amygdaliformis, *Vill*; Malus acerba, *Decand.* Sorbus latifolia, *Pers.*

Pyrus arbutifolia, melanocarpa, *Willd.* Aronia alnifolia? *Nutt.*

2. Folia pinnata v. alte pinnatifida. (*Sorbus.*)

Pyrus hybrida *Willd.* Sorbus aucuparia, hybrida, domestica, *Willd.*; auriculata? *Pers.*; microcarpa? *Pursh.*

3. Folia simplicia. Petala parva, erecta, concava, conniventia. (*Chamæmespilus.*)

Mespilus Chamæmespilus *Willd.*

To the first section must be added several undescribed species from India and China in the herbaria of Sir Joseph Banks and Mr. Lambert, with one from Mexico in the collection of the last gentleman. *Malus* of Tournefort and Jussieu has styles united towards their base. But this is scarcely of even specific importance; for it occurs in *Cratægus Oxyacantha*, which has commonly separate styles, and is variable in *Chænomeles* and *Amelanchier Botryapium.*

Pyrus arbutifolia, and perhaps those allied to it, has the rudiment of a spurious dissepiment.

IV. OSTEOMELES.

Pyri Sp. *Smith.*

Cal. 5-dentatus. *Petala* oblonga, plana. *Styli* exserti, infra medium barbati. *Ovula* solitaria. *Pomum* clausum, (lanatum,) 5-loculare, endocarpio osseo.

Frutex

J. L. ad sicc. del

J. Curtis sculp.

Osteomeles anthyllidifolia.

Frutex (*Insularum Sandwich*). Folia *pinnata :* foliolis *integerrimis.* Bracteæ *subulatæ, deciduæ, sub calyce oppositæ.* Pomum *parvum, stylis et sepalis coronatum.*

1. Osteomeles anthyllidifolia.

Tab. VIII.

Pyrus anthyllidifolia. *Smith in Rees in l.*
Hab. in insula Owhyhee. *Menzies (v. s. sp. Herb. Banks).*
Foliola obovata apiculata, subtus sericea.

This curious plant was gathered by Mr. Menzies near the summit of the Wharrarai mountain of Owhyhee. Sir James Smith, who had not seen the fruit, from its resemblance to the pinnated *Pyri*, published it in Rees's *Cyclopædia* under the name of *Pyrus anthyllidifolia.* There is, however, no instance of leaves with an entire margin among *Pyri*; and the fruit which is preserved in Sir Joseph Banks's herbarium proves it to be a very distinct genus, differing from *Pyrus* in having bony fruit, and from *Cratægus* in shape of petals, solitary ovula, persistent styles, which are woolly on their lower half, and whole habit. Nor do the filaments of *Osteomeles* spread, as is the case with *Cratægus.*

Eriobotrya is distinguishable by its very much shorter styles, which are slightly downy all over, twin ovula, bearded petals, and fleshy fruit.

V. MESPILUS.

Tourn., Linn., Juss.

Cal. 5-partitus, laciniis foliaceis. *Discus* magnus, mellifluus. *Styli* glabri. *Pomum* turbinatum, apertum, 5-loculare : endocarpio osseo.

Arbores *mediocres* (*Europæ*). Folia *lanceolata, serrulata, decidua.* Flores *magni, subsessiles, subsolitarii.* Bracteæ *persistentes.*

 Petala

Petala *orbiculata, patentia* (*margine crispa*). Loculi *cultarum sæpissimè vacui.*

1. Mespilus germanica *Willd.* 2. M. grandiflora *Smith Exot. Bot.*

To plants with these characters I propose to limit *Mespilus*, which will then include those species only with eatable fruit. It will be distinguishable from all the other genera with osseous endocarp by the foliaceous segments of its calyx, and fruit whose cells are naked at the top, and not covered over by the incrassated disk and connivent segments, as in *Cratægus*, &c.

The remainder of the genus in Willdenow is a mass of species differing as much from each other as from true *Mespili*. Thus, *M. japonica* constitutes my genus *Eriobotrya*; *M. Pyracantha* is not distinct from *Cratægus*; *M. Chamæmespilus* is a *Pyrus*; and *Cotoneaster* and *tomentosa* belong to Medicus's genus *Cotoneaster.*

VI. AMELANCHIER.

Amelanchier. *Medicus.* Aroniæ pars. *Persoon.*

Cal. 5-dentatus. *Petala* lanceolata. *Ovarium* decem-loculare. *Ovula* solitaria. *Pomum* 3—5-loculare endocarpio cartilagineo.

Arbusculæ (*Europæ* et *Americæ septentrionalis*). Folia *simplicia, serrata, decidua.* Flores *racemosi, compacti, terminales v. laterales.* Bracteæ *lineari-lanceolatæ, deciduæ.* Stamina *calyce sæpius breviora.* Styli *glabri.* Loculi *angulo interiore* (*facie*) *pilosi.*

1. Pyrus Amelanchier *Willd.* 2. Pyrus Botryapium *Willd.* 3? Pyrus ovalis *Willd.* 4. Pyrus cretica *Willd.*

VII. COTO-

J.L. ad sicc. del. J. Curtis sculp.

Cotoneaster acuminata.

VII. COTONEASTER.

Cotoneaster. *Medicus.* Mespili species. *Linn.*, *Willd.* Pyri. *Mönch.*

Flores polygami.

Cal. turbinatus, obtusè 5-dentatus. *Pet.* brevia, erecta. *Stamina* dentium longitudine. *Styli* glabri, staminibus breviores. *Achenopses* parietales, calyce inclusæ.

Arbusculæ (*Europæ, Americæ septentrionalis,* et *Indiæ*). Folia *simplicia, integerrima, infrà lanata.* Corymbi *laterales, patentes.* Bracteæ *subulatæ, deciduæ.* Petala *parva, persistentia.*

vulgaris. 1. C. foliis ovatis basi rotundatis, calycibus pedunculisque nudis.
Mespilus Cotoneaster. *Willd.*
Hab. in Europæ alpestribus; Sibiriæ *Pallas* (*v. v. c. et s. sp. Herb. Banks.*).

tomentosa. 2. C. foliis ellipticis utrinque obtusis, calycibus pedunculisque lanatis.
Mespilus tomentosa. *Willd.*
Hab. in alpibus Tyrolensibus, *Von Born* (*v. v. c. et s. sp. Herb. Banks.*).

affinis. 3. C. foliis ovatis basi attenuatis, calycibus pedunculisque lanatis.
Hab. Chittong, *Buchanan* (*v. s. sp. Herb. Lambert.*).
Præcedenti similis, sed satis distincta.

acuminata. 4. C. foliis ovatis acuminatis utrinque pilosiusculis, calycibus pedunculisque nudis. Tab. 9.
Hab. in Nepalia, *Wallich* (*v. s. sp. Herb. Banks.*).
Rami virgati. Folia non subtus lanata. Pedunculi quam priorum breviores.

VIII. ERIO-

VIII. ERIOBOTRYA.

Mespili species. *Thunb.*, *Willd.*

Cal. lanatus, obtusè 5-dentatus. *Pet.* barbata. *Stam.* erecta, dentium longitudine. *Styli* 5, filiformes, inclusi, pilosi. *Pomum* clausum, 3—5-loculare. *Chalaza* nulla. *Radicula* inter bases cotyledonum inclusa.

Arbores mediocres (*Asiæ temperatæ* et *Peruviæ*). Ramuli *tomentosi*. Folia *simplicia*, *serrata*, *infrà lanata*. Racemi *compositi*, *terminales*, *lanati*. Bracteæ *subulatæ*, *deciduæ*.

japonica. 1. E. foliis lanceolatis serratis.
Mespilus japonica. *Thunb.*
Hab. in Japonia (*Thunb.*); China, *Loureiro* (*v. v. c. et s. sp. Herb. Banks.*).

elliptica. 2. E. foliis planis ellipticis obscurè denticulatis.
Mespilus Cuila. *Buch. Mss.*
Hab. ad Narainhetty, *Buchanan* (*v. s. sp. Herb. Lambert*).
Obs. Facies prioris.

cordata? 3. E. foliis cordatis serratis.
Mespilus lanuginosa. *Fl. Peruv. t.* 425. *f.* 1. *ined.*
Hab. in Peruviâ. *Pavon* (*v. s. sp. Herb. Lambert*).
Rami villis ferrugineis strigosi. *Folia* petiolata cordata obtusa serrata, suprà plana pilosiuscula glaberrima rugosa, infrà ferruginea villosa venis prominentibus. *Stipulæ* hirsutæ. *Fructus* (fide iconis) parvus rotundus non lanuginosus.

4? Mespilus heterophylla. *Fl. Peruv. t.* 425. *f.* 2. *ined.*

I am obliged to Mr. Brown for my knowledge of the structure of the fruit of this genus, which I have never been able to procure.

IX. PHO-

IX. PHOTINIA.

Cratægi species. *Thunb.*

Cal. 5-dentatus. *Petala* reflexa. *Ovarium* semi-superum, villosum, biloculare. *Styli* 2, glabri. *Pericarpium* biloculare calyce carnoso inclusum. *Testa* cartilaginea.

Arbores (*Asiæ temperatæ* et *Californiæ*). Folia *simplicia, coriacea, sempervirentia, serrata v. integerrima.* Paniculæ *compositæ, corymbosæ, terminales.* Fructus *parvi, impubes.*

serrulata. 1. P. foliis oblongis acutis serrulatis, pedicellis calyce longioribus.

Cratægus glabra. *Thunb.*

Hab. in Japonia (*Thunb.*); China, *illustr. Staunton* (*v. v. c. et s. sp. Herb. Banks.*).

arbutifolia. 2. P. foliis oblongo-lanceolatis distanter dentatis, pedicellis calyce brevioribus.

Cratægus arbutifolia. *Ait. Kew. ed. alt.* iii. 202.

Hab. in California. *Menzies* (*v. s. sp. Herb. Banks*).

Habitus præcedentis. Paniculæ non corymbosæ. Folia margine revoluta.

integrifolia. 3. P. foliis ovalibus integerrimis, ramis pustulatis.

Hab. in Nepalia. *Wallich* (*v. s. sp. Herb. Banks* et *Lamb.*).

Rami glabri angulati papillis crebris pustuliformibus scabrosi. *Folia* petiolata glaberrima integerrima ovalia, basin versus quandoque attenuata, reticulato-venosa. *Paniculæ* compositæ corymbosæ glaberrimæ ebracteatæ. *Styli* crassi patentes. *Loculi* dissepimento spurio semi- 2-partiti, ideoque ovula quasi solitaria. *Fructus* ignotus.

Charac-

Characteribus priorum paulò recedit ob loculos ovarii semi- 2-partitos et folia integerrima. Vix autem genus diversum.

dubia. 4? P. foliis lanceolatis distanter serratis, panicula pilosa. Tab. 10.

Cratægus Shicola. *Buchan. Mss.*

Mespilus benghalensis. *Roxb. Fl. Ind. ined.*

Hab. in Nepalia, *Wallich* (*v. s. sp. Herb. Banks* et *Lambert.*).

Obs. Species generis dubii. Forte *Photiniâ* distincta ob fructum inferum unilocularem et semen magnum solitarium testâ laxâ vestitum. Sed cum petala sint reflexa et ovarium semi-superum biloculare, hùc referre quam genus alterum efformare malui.

An hùc referendæ *Cratægus villosa* et *lævis* Thunbergii?

X. CHAMÆMELES.

Cal. truncatus, 5-denticulatus. *Petala* parva, erecta, erosa. *Filamenta* filiformia. *Ovarium* inferum, monostylum, uniloculare. *Ovula* bina, erecta.

Frutex (*Maderæ*). Folia *simplicia, coriacea, nitida, obsolete crenata.* Stipulæ *membranaceæ, deciduæ.* Racemi *axillares, basi foliosi.*

1. CHAMÆMELES CORIACEA.

TAB. XI.

Cratægus coriacea. *Soland. Mss.*

Buxo *Maderensibus.*

Hab. in Maderæ rupibus. *Masson* (*v. s. sp. Herb. Banks*).

Inermis? foliis cuneiformibus subaveniis. *Racemi* pilosiusculi.

Stamina

Photinia dubia.

J. Curtis sculp.

Chamæmeles coriacea.

Stamina 10—15 basi vix dilatata, erecto-patentia. *Discus* tenuis. *Ovarium* nudum. *Stylus* crassus subclavatus, basi pubescens. (*Fructus* immaturus dispermus. *Sol.*)
Variat foliis majoribus et minoribus.

That variety of *Cratægus Oxyacantha* which has been called *monogyna*, can by no means affect the importance of the character by which I propose to distinguish this genus; because in the former the unilocularity of fruit is not connected with a corresponding structure of ovarium, but arises from the abortion of one style. In the present plant the ovarium in its youngest state is absolutely unilocular.

XI. RAPHIOLEPIS.

Cratægi species. *Linn.*
Calycis limbus infundibuliformis deciduus. *Filamenta* filiformia. *Ovarium* biloculare. *Pomum* disco incrassato clausum, putamine chartaceo. *Semina* gibbosa. *Testa* coriacea crassissima.
Frutex (*Chinensis*). Folia *simplicia crenulata coriacea reticulata.* Racemi *terminales bracteis foliaceis persistentibus squamosi.*
1. Cratægus indica *Linn.*
2? Cratægus rubra *Lour.*

XII. CRATÆGUS *Linn.*, *Willd.*

Mespili pars. *Smith*, *Willd.* Pyri sp. *Willd.* Hahniæ pars. *Medicus.*
Cal. 5-dentatus. *Petala* patentia orbiculata. *Ovarium* 2—5-loculare. *Styli* glabri. *Pomum* carnosum oblongum dentibus calycinis v. disco incrassato clausum, putamine osseo.
Frutices (*Americæ septentrionalis*, *Europæ*, *Asiæ temperatæ* et *Africæ borealis*) *spinosæ.* Folia *angulata v. dentata*, *nunc sempervirentia.* Cymæ *terminales plerumque multifloræ patentes.* Bracteæ *subulatæ deciduæ.*

 Cratægus

Cratægus cordata, coccinea, pyrifolia, elliptica, glandulosa, parvifolia, flava, punctata, Crusgalli, Oxyacantha (including monogyna), and Azarolus *Willd.*; crenulata, *Roxb.*; Mespilus Pyracantha, *W.*; tanacetifolia, *Smith*; Pyrus terminalis, *W.*

And probably

Cratægus viridis, maura, pentagyna, *Willd.*; nigra, *W.* et *K.*; apiifolia, spathulata, *Mich.*; turbinata, *Pursh*; melanocarpa, orientalis, *Bieberstein*.

Cratægus thus limited is a strictly natural genus divisible into two sections, of which the first may contain the species with evergreen nearly entire leaves, and the other those with angular deciduous ones. Each will be increased with several unpublished plants in the Banksian herbarium; and among the drawings of the Chinese is a species with quinate leaves.

Mespilus Pyracantha L. is referable to the first section, notwithstanding it differs in some respects.

TABULARUM EXPLICATIO.

a. Flos integer.
*a.** Idem petalis avulsis.
b. Idem verticaliter sectus.
c. Ovarii sectio transversa.
*c.** Ovarium sejunctum.
d. Fructus integer.
e. Idem per axin divisus.
f. Ejusdem sectio transversa.
g. Pericarpium sejunctum.
h. Semen.

XII. *Account of some new Species of Birds of the Genera Psittacus and Columba, in the Museum of the Linnean Society. By M. C. J. Temminck, F.M.L.S. &c.*

Read December 21, 1819.

En présentant ce premier Mémoire sur quelques oiseaux de la Nouvelle Hollande découverts dans les dernières années, je satisfais aux vues de cette Société, qui a bien voulu me permettre de publier la description des espèces nouvelles d'animaux de l'Austral-Asie, dont elle possède une riche et précieuse collection ; d'autant plus intéressante qu'elle se borne aux productions de ces contrées, abondantes en êtres dont l'organisation et les formes extérieures sont uniquement propres à ce sol et à ces mers, pour ainsi dire encore vierges pour nos connoissances en Zoölogie.

Il est certain que la Nouvelle Hollande et les nombreuses îles répandues dans l'immense Océan pacifique, nourrissent une multitude d'animaux de toutes les classes, dont les formes présentent des traits extraordinaires qui les lient plus ou moins entre-eux, et dont plusieurs se trouvent séparés de tous les êtres qui vivent dans les autres parties du globe. Les découvertes nouvelles, qui n'ont pu tendre jusqu'ici qu'à nous faire connoître les côtes et un grand nombre d'îles ou d'archipels de ce singulier pays, ont mise déjà cette vérité au grand jour, et les tentatives faites très récemment pour pénétrer dans l'intérieur en fourniront sans-doute de nouvelles preuves.

 C'est

C'est surtout parmi les êtres dont l'organisation est la plus compliquée ou la plus parfaite, que les différences avec les animaux des autres contrées sont les plus dignes d'être remarquées ; témoins les genres *Dasyurus* Geoff. ; *Perameles* Geoff. ; *Balantia* Illig. ; *Phalangista* Illig. ; *Hypsyprymnus* Illig.* ; *Halmaturus* Illig.†; *Phascolomys* Geoff.‡ ; *Echidna* Cuv.; *Ornithorhynchus* Blumenb.; tous genres parfaitement bien caractérisés, qui n'ont point d'analogues parmi les Mammifères connus des autres contrées.

Quoique parmi les oiseaux de la Nouvelle Hollande il s'en trouve un plus grand nombre qui viennent se grouper très naturellement dans les genres de Linné, ce singulier pays produit nonobstant des groupes entiers et des espèces jusqu'ici isolées, qui ne laissent point que d'offrir des différences très notables dans leur organisation comparativement aux espèces connues des autres parties du globe : tels sont particulièrement les nouveaux genres *Ptelenorhynchus*§ *Glaucopis* Forst. ; *Grallina* Vieill. ; *Menura* Lath. ; *Ocypterus* Cuv. ; *Malurus* Vieill. ; *Psittarostra*|| *Scythrops* Lath. ; *Orthonyx**, *Anerpous*†, *Meliphaga* Lewin‡; *Falcator*§ *Pardalotus* Vieill. ; *Chionis* Forst. ; *Pachy-*

* M. Shaw range la seule espèce connue avec les autres Kanguros dans le genre *Macropus.*

† C'est le genre *Macropus* dans Shaw. ‡ C'est *Didelphis ursina* de Shaw.

§ Dont je ferai connoître les espèces dans un autre Mémoire.

|| La seule espèce qui le compose est ce singulier oiseau indiqué par Latham sous le nom de *Loxia Psittacea.*

* Genre nouveau dont je ferai connoître la seule espèce inédite qui le compose.

† Nouveau genre composé de trois espèces inédites.

‡ M. Cuvier, qui est si exact à rendre justice aux travaux de ceux qui ont écrit avant lui, n'a sans-doute pas su que Lewin (*Birds of New Holland*) a nommé ainsi les oiseaux dont il forme son nouveau genre *Philedon.* Lewin en figure trois, mais le quatrième sous le nom de *Meliphaga chrysocephala* est un vrai Loriot (*Oriolus*). Je connois aujourd'hui plus de 40 espèces de ce genre, dont 32 font parti de mon cabinet.

§ Ce nouveau genre se compose des *Certhia pacifica, obscura, coccinea,* et *falcata* de Linn. Gmel.

ptila

ptila Illig. Tous ces genres d'oiseaux n'ont point d'espèces semblables parmi celles des autres pays; les caractères pris de la forme des pieds et du bec, et comme accessoires de la langue et des ailes, offrent des disparités faciles à saisir et bien marquées dans tous; ils ne peuvent occuper une place dans les genres de Linné ni dans ceux déjà trop nombreux de quelques naturalistes. Bien loin d'être de l'avis de certains novateurs, qui pour les plus légères différences observées, tantôt dans la forme de la queue, dans celle des ailes, dans les ornemens extraordinaires et accessoires, tels que huppes, caroncules, ou nudités; enfin dans certains organes qui ne servent point aux principales fonctions animales, établissent sur des bases si peu solides et seulement d'après les dépouilles d'animaux, une multitude de genres nouveaux; loin de suivre une pareille méthode, qui ne peut mener qu'à la confusion de noms, et bientôt entrainera celle des choses, je me suis particulièrement occupé en établissant le système auquel je travaille depuis plus de dix ans, à réduire autant que possible au plus petit nombre les genres nouveaux, que les découvertes faites depuis Linné, d'un immense pays et de nombreux archipels peuplés d'une multitude d'animaux, rendent absolument indispensable. Je me suis également appliqué dans mon travail sur l'ornithologie d'Europe*, à diminuer le nombre des espèces nominales dont presque toutes les méthodes sont encombrées.

Dans le présent mémoire je ne ferai mention que de ces espèces de *Perroquets* et de *Pigeons* dont aucun auteur jusqu'ici n'a fait mention, ou qui ont été confondues avec des espèces déjà indi-

* La nouvelle édition du *Manuel d'Ornithologie,* ou *Tableau Systématique des Oiseaux d'Europe,* paroîtra dans le courant de l'année 1820. Elle sera précédée d'un apperçu général de classification méthodique, qui servira de base à mon index général, dont les espèces ont été soigneusement examinées dans tous les cabinets marquants en Europe.

quées.

quées. Le plus grand nombre de ces oiseaux inconnus ont été rapportés des côtes sud, est et nord de la Nouvelle Hollande, par Mr. Robert Brown, botaniste célèbre, qui a bien voulu me communiquer, pour ce mémoire, des renseignemens tirés de ces notes, qui m'ont été d'une grande utilité. J'aurais pu ajouter encore plusieurs espèces de Perroquets et de Pigeons nouveaux de mon cabinet, et dont j'ai vu des individus dans d'autres collections; mais je me suis borné ici aux seules espèces nouvelles qui font partie du cabinet de cette Société.

Le grand genre *Psittacus*, vu les espèces dont il se compose, qui toutes ont la même charpente osseuse, les mêmes organes, les mêmes muscles, les mêmes mœurs, et approchant les mêmes appétits, ne peut être subdivisé qu'en sections de sous ordre, mais point en genres distincts; car celui de *Pezoporus*, établi par Illiger d'après le *Psittacus formosus* de Latham ou la *Perruche ingambe* de Vaillant, ne peut être adopté vu que plusieurs Perruches à queue longue et étagée de la Nouvelle Hollande, ont des tarses un peu plus longs que leurs congénères; et cette longueur du tarse, des doigts et même des ongles variant dans les espèces, sans qu'il soit possible d'assigner une limite fixe et certaine. Semblable cas existe aussi dans la forme plus ou moins bombée des deux mandibules dans certains Cacatoes et Perroquets*, comme *Psittacus Banksii* et *galeatus* de Latham et *Psittacus Cookii* et

* Il est difficile, pour ne pas dire impossible, d'établir une ligne de démarcation entre les *Cacatoes* et les *Perroquets,* car les *Psittacus accipitrinus* et *mascarinus* de Linné forment le passage des Cacatoes de l'Inde aux Perroquets des trois parties du monde; tandis que *Psittacus galeatus* de Latham forme celui de ces derniers aux Cacatoes à bec bombé de Nouvelle Hollande.

Je crois être à même de prouver par mon Index Général, que les divisions géographiques, employées comme premier moyen de classification méthodique, facilitent et simplifient beaucoup les recherches, qui deviennent de plus en plus difficiles et fastidieuses par cette multitude de divisions et de noms de tribus et de familles dont on a encombré les systèmes nouveaux.

Solandri

Solandri du présent mémoire ; dans la forme plus ou moins comprimée de la mandibule supérieure, comme *Psittacus funereus* et *Nestor* ; la nudité ophtalmique plus ou moins étendue sur les joues dans les *Aras*, les *Perruches aras* et les *Perriches* indiquées par les naturalistes. Mais tous ces caractères, assez tranchés pour ceux qui n'ont qu'un nombre très borné d'êtres comme moyen de comparaison, se réduisent à rien, ou dumoins à bien peu d'importance pour ceux, qui, par le moyen de comparaisons multipliées faites sur toutes les espèces connues de nos jours, ont pu embrasser une plus grande portion des êtres créés. Alors tous ces caractères, dont la valeur paroît aux yeux du naturaliste sédentaire et de cabinet comme moyens propres à servir à leurs divisions strictement méthodiques, deviennent nuls comme ligne de démarcation entre de tels groupes, et ne peuvent plus servir qu'à établir une série naturelle, sans intervalle assignable, dans les espèces d'un même genre.

Le genre *Psittacus* dont nous nous occupons, si on voulait le diviser rigoureusement selon les vues neuves de certains naturalistes, pourroit former une vingtaine de genres, tous aussi peu caractérisés que celui des *Pezoporus* d'Illiger.

PSITTACUS *Cookii.* CACATOE *de Cook.*

DIAGNOSE. Bec couleur de plomb ; très élargi et bombé sur les côtés, presque rond ; aréte de la mandibule supérieure comprimée tranchante ; mandibule inférieure de la même largeur à sa pointe qu'à sa base ; front et tête ornés d'une longue huppe comprimée, pennes latérales de la queue noires ; un grand espace de couleur vermillon, sans aucune raie, sur le milieu de ces pennes ; tout le plumage d'un noir parfait.

Cette espèce est indiquée par Latham, dans son *Index Ornithologicus, vol.* i. *p.* 107, *sp.* 76. *var.* γ. sous le nom de *Bankian Cockatoo,*

Cockatoo, d'après Phillip *Voy. à Bot. Bay, p.* 267 *cum tab.*; mais cette prétendue variété forme une espèce bien caractérisée par la forme du bec, et par ses couleurs, toujours les mêmes*; les voyageurs assurent qu'elle habite des lieux différens que le *Bankian Cockatoo* (*Psittacus Banksii*); dont les caractères essentiels sont —Bec blanc, aréte de la mandibule supérieure obtuse et déprimée†; base des deux mandibules très-bombée sur les côtés, l'inférieure devenant graduellement plus étroite vers la pointe; front et tête ornés d'une longue huppe comprimée; pennes latérales de la queue noires, rayées de larges zigzags rouges et jaunatres.—Tout le plumage, ainsi que la huppe, d'un noir lustré, varié sur les parties inférieures de bandes jaunatres, et sur les parties supérieures de petites taches triangulaires de la même couleur. Longueur totale 2 pieds trois pouces‡.

Le *Psittacus Cookii*, que nous distinguons du *Psittacus Banksii* par les caractères essentiels indiqués dans la diagnose, se reconnoit encore à son plumage totalement noir, sans aucune tache ni raie; ce noir est mêlé de teintes d'un cendré brun mat, dans le jeun âge, et prend chez les adultes un ton de noir lustré, très prononcé; on ne voit chez ceux dont le plumage est moins parfait comme dans les adultes, d'autres couleurs que le beau rouge

* M. Kuhl de Hanau, naturaliste plein de zèle et de connoissances, m'a le premier rendu attentif aux différences qui distinguent cette espèce du *Psittacus Banksii* de Lath. que je supposais avec Latham variété du Cacatoe de Banks. Ce jeune naturaliste vient d'être chargé par le Gouvernement des Pays-bas d'une mission tendant à explorer, dans le but des découvertes en histoire naturelle, ses possessions dans les mers de l'Inde. Le noble dévouement dont M. Kuhl est animé promet à cette science des découvertes intéressantes.

† Absolument comme dans le *Cacatoe carrat* (*Psittacus funereus* Lath. *Supp.*) et comme chez tous les autres Cacatoes des Moluques. Le bec au *Psittacus funereus* n'est point bombé ni renflé sur les côtés; et la mandibule inférieure de cette espèce, qui se trouve à la Nouvelle Hollande, n'est point extraordinairement élargie comme dans les trois autres espèces de ce même pays.

‡ La mesure est suivant le pied de Paris.

vermillon

vermillon, dont la partie intermédiaire, entre la base et la pointe des pennes latérales de la queue, est ornée; le bec de *Psittacus Banksii* est toujours d'un blanc jaunâtre; celui de *Psittacus Cookii* est toujours d'un bleu couleur de plomb.

Cette espèce, ainsi que tous les Cacatoes de la Nouvelle Hollande, se nourrit de racines des plantes bulbeuses et de fruits; on la trouve à la côte orientale, dans les environs de Port Jackson.

PSITTACUS *Solandri** ? CACATOE *de Solander.*

DIAGNOSE. Bec couleur de plomb, très bombé, très élargi sur les côtés, presque rond; aréte de la mandibule supérieure comprimée, tranchante, mandibule inférieure de la même largeur à sa pointe qu'à sa base; point de huppe comprimée sur le front, mais les plumes un peu longues sur le sommet de la tête. Plumage de la tête, du cou et des parties inférieures d'un brun terreux, nuancé de jaunâtre, particulièrement à la région des yeux et des oreilles; ailes et dos d'un noir à reflets verdâtres; queue noire; vers le milieu de toutes les pennes latérales est un grand espace d'un rouge vermillon très vif, rayé de cinq bandes noires en zigzag. Le bec est très large et très bombé à sa base, surtout à la mandibule inférieure dont les bords latéraux dépassent, de beaucoup, ceux de la mandibule supérieure, qui est également très renflée et bombée à sa base; mais qui se termine vers l'aréte et vers la pointe en lame un peu tranchante. Longueur totale 1 pied 8 pouces.

Je ne décide point sur la question de l'identité ou de la différence de l'oiseau indiqué avec *Psittacus Cookii* de l'article précédent, dont celui-ci pourroit bien être le jeune de l'année; ceux

* Je place un signe de doute à cet article, vu qu'il me paroît probable que c'est ici le jeune de l'année de *Psittacus Cookii*.

qui ont vu les deux oiseaux vivant et en liberté peuvent seuls en juger avec pleine connoissance de cause ; je vais indiquer succinctement les rapports et les différences essentielles que j'ai été à même d'observer sur sept individus du *Psittacus Solandri* et sur huit individus du *Psittacus Cookii* ; espèce qui diffère essentiellement de *Psittacus Banksii*, dont j'ai examiné plus de douze individus.

Tous les individus de *Psittacus Cookii*, que j'ai vu, se ressembloient presque sous tous les rapports entre-eux : les uns se trouvoient d'un noir plus profond et plus lustré que les autres ; deux, que je présume plus jeunes, avoient les teintes générales plus sales et tirant au cendré brun, mais toujours même caractère de huppe, et la couleur vermillon des pennes caudales bien prononcée, sans aucune raie noire ; comme aussi tout le plumage sans aucune tache ; leurs dimensions toujours les mêmes, et approchant de 2 pieds 2 ou 3 pouces en longueur totale.

L'espèce douteuse de *Psittacus Solandri* présentoit quelques variétés dans les différens individus. Ces différences résidoient toujours dans le brun plus ou moins olivâtre de la tête et du cou, et dans le plus ou le moins de jaunâtre irrégulièrement disposé à la tête, aux joues, au front ou aux oreilles* ; dans les plumes du milieu de la tête plus ou moins longues et plus ou moins foncées, mais jamais aucun indice de huppe frontale. Je n'ai vu sur aucun des individus d'autres couleurs à la queue que le rouge pur et vif, traversé par cinq bandes étroites et noires ; je n'ai jamais observé aucune tache ou raie colorée sur le plumage très uniforme des ailes et du corps : les plus fortes dimensions ne dépassent point 1 pied 8 ou 9 pouces en longueur totale.

* On doit cependant avertir ici, que le caractère prononcé de *Psittacus funereus* de Lath. *Suppl.* ou du *Cacatoe carrat*, est d'avoir le meat auditif couvert de plumes jaunes. Du reste ce Cacatoe à *bec non bombé* forme une espèce parfaitement caractérisée, soit par le bec, comme par la forme et par la couleur de la queue.

J'ai

J'ai trouvé une ressemblance, si non parfaite, du moins très rapprochée entre les formes et la couleur du bec de *Psittacus Cookii* et de *Psittacus Solandri*; ajouter, que ces deux oiseaux habitent les mêmes lieux, et qu'on les trouve souvent réunis plusieurs dans une même bande. Les individus rapportés par les naturalistes François de l'expédition du Capitaine Baudin, comme ceux qui ont été envoyés en Angleterre, viennent tous des environs du Port Jackson.

PSITTACUS *nasicus*. CACATOE *nasique*.

La couleur blanche du plumage des Perroquets désignés sous le nom de *Cacatoe*, n'est point uniquement propre aux espèces qui habitent les îles de la Sonde, aux Moluques et aux Philippines; la Nouvelle Hollande en nourrit aussi une espèce, dont le genre de vie, suivant les rapports des voyageurs, ne diffère point de ceux des Cacatoes noirs qu'on trouve dans le même pays.

Cette espèce se distingue de tous les Perroquets connus, par la longueur presque disproportionnée de la mandibule supérieure, dont la pointe, quoique moins courbée que ne l'est d'ordinaire cette partie chez les oiseaux du genre, est beaucoup plus allongée et plus effilée en proportion de la mandibule inférieure, qui est petite et arrondie.

Une très petite huppe frontale distingue encore cet oiseau, qui se rapproche par ce caractère de *Psittacus Philippinarum* de Lath., espèce d'un quart plus petite que notre nasique, mais dont la huppe, quoique plus longue, ressemble parfaitement à celle de ce dernier.

Les couleurs de cette nouvelle espèce sont, un blanc pur, répandu sur presque tout le plumage excepté la face, dont les teintes rosées se nuancent jusques près des yeux; l'anus et les couvertures inférieures de la queue sont d'un jaune rougeâtre, et

la base des pennes caudales est jaunâtre ; le bec et les pieds sont cendrés ; la longueur totale est de 15 pouces 3 ou 4 lignes.

M. Brown a rapporté cette espèce du Port Phillip à la côte sud de la Nouvelle Hollande.

Psittacus *flavigaster*. Perruche *à ventre jaune.*

Je commence la description des Perruches de la Nouvelle Hollande à queue large et longue et à joues colorées de couleurs tranchés, par une espèce que M. Le Vaillant confond avec sa *Perruche à large queue* (ou *Psittacus Pennantii* de Lath.) comme une variété dont il donne une figure très exacte pl. 80 de ses *Perroquets*, probablement prise sur un individu un peu décoloré.

M. Le Vaillant conjecture que cette variété pourroit bien être la femelle adulte de sa Perruche à large queue, pl. 78 ; mais cette supposition n'a point été confirmée.

M. Brown, qui a rapporté notre Perruche de cet article, m'a assuré qu'elle forme une espèce distincte bien connue comme telle à la Nouvelle Hollande. L'examen que j'ai fait moi-même de neuf individus en plumage parfait de l'adulte, de deux individus dans le passage, et de trois jeunes oiseaux, m'a convaincu de la différence très marquée qui existe entre ma *Perruche à ventre jaune* et la *Perruche à large queue* de Vaillant, qui est le *Psittacus Pennantii* de Lath. Le male et la femelle de la *Perruche à large queue* diffèrent très peu, par les couleurs du plumage, qui sont moins pures dans la femelle.

Le sommet de la tête, la partie supérieure de la nuque, et généralement toutes celles inférieures depuis la gorge jusqu'à l'anus, sont d'un jaune citron ; un large bandeau rouge ceint le front ; la partie inférieure de la nuque, le dos et les ailes sont d'un brun noirâtre nuancé d'un leger ton verdâtre : toutes les plumes de ces

ces parties étant bordées de vert: les remiges et le bord extérieur des ailes présentent différentes teintes de bleu très vif; le croupion est d'un vert jaunâtre; les pennes du milieu de la queue sont vertes, les latérales ont du bleu très foncé depuis leur origine, ensuite elles sont d'un bleu clair, et leur bout est blanc; le bec est d'un jaune blanchâtre, et les pieds sont bruns. La longueur totale est de 13 pouces 6 lignes; le male et la femelle ont à peu-près les mêmes couleurs, mais différens dans les nuances, moins pures, chez la femelle.

Les parties du plumage qui chez les individus adultes sont d'un beau jaune, se trouvent dans les jeunes d'un vert totalement nuancé de jaunâtre; toutes les plumes du dos et des ailes sont chez les vieux d'un brun noirâtre avec de très étroites bandes vertes, tandis que les jeunes ont le milieu de ces plumes d'un brun clair entouré de larges bords verts; ce qui les fait paroître presque entièrement vertes.

La principale différence entre les jeunes de *Psittacus flaviventris* et *Psittacus Pennantii* est, que les premiers se distinguent toujours par du vert très clair, passant au vert jaunâtre et prenant successivement plus de cette couleur. Les jeunes de la seconde espèce sont d'un vert foncé, et ce vert foncé ne change, par la mue, qu'en rouge écarlate ou ponceau, qui est la couleur de la plus grande partie du plumage chez les adultes. Chez les jeunes de *Psittacus Pennantii* on remarque aussi la bande frontale rouge, qui est propre aux jeunes et aux vieux de *Psittacus flaviventris*; mais les premières plumes de l'état parfait, qui paroissent près de ce bandeau, sont jaunes dans l'espèce de cet article et ponceau dans l'autre.

Le seul synonyme de cette espèce est la planche enluminée no. 80 du second volume des *Perroquets* par M. Le Vaillant.

Les synonymes de *Psittacus Pennantii* sont, Lath. *Ind. Orn. v.* i. *p.* 90. *sp.* 29. *Psittacus elegans*, Lath. *Ind. p.* 89. *sp.* 23,

description

description d'un jeune individu passant à l'état adulte; *Psittacus gloriosus*, Shaw *Nat. Miscell. v.* i. *pl.* 53.—Cet ouvrage est rempli d'animaux connus, mais indiqués sous des noms nouveaux.—*La Perruche à large queue* Vaill. *Perroq. v.* ii. *pl.* 78, un oiseau adulte, et *pl.* 79, un individu passant du jeune-âge à l'adulte.

Psittacus *Baueri*. Perruche *de Bauer*.

Une calotte d'un brun pur couvre la tête, s'étend sur les yeux et se termine à la nuque, où un large collier d'un jaune citrin se dessine; les bords supérieurs de ce collier remontent, de chaque côté, jusqu'à l'orifice des oreilles; les joues sont d'un bleu foncé; toutes les parties supérieures du corps, les deux pennes du milieu de la queue, le cou et la poitrine sont d'un beau vert foncé; le bord extérieur du poignet de l'aile est coloré de vert jaunâtre, les remiges sont brunes vers le bout, mais bordées longitudinalement de bleu très foncé; les pennes latérales de la queue, d'un bleu foncé depuis leur origine, sont toutes terminées de bleu clair; le milieu de ventre est d'un beau jaune, mais sur les flancs et sur les couvertures inférieures de la queue règne une teinte verte pure et claire; le bec est d'un cendré jaunâtre, et les pieds bruns. Longueur totale 13 pouces.

On le trouve à Memory Cove, à la côte sud de la Nouvelle Hollande.

La place que cette espèce doit occuper, est dans le groupe des Perruches à large queue, longue et régulièrement étagé, à bec peu gros; le plus souvent marquées aux joues par un grand espace blanc, rouge, jaune, ou bleu très vif; leur tarse varie plus ou moins en longueur.

La présente espèce ainsi que *Psittacus flaviventris* sont voisines de *Psittacus Pennantii* de Latham *Ind.*, ou *la Perruche à large queue* de Vaillant.

Psittacus

PSITTACUS *Brownii*. PERRUCHE *de Brown*.

Une calotte d'un noir profond couvre la tête, s'étend sur les yeux et aboutit à la nuque, où les plumes noires sont terminées par des points rouges; les joues sont d'un blanc pur, qui se nuance au dessous des yeux, par demi-teintes, en bleu azur; plumes du dos et des scapulaires noires dans le milieu, toutes entourées par un zone d'un beau jaune; croupion, devant du cou, poitrine et ventre d'un blanc jaunâtre, toutes les plumes de ces parties étant terminées par un liseré noir très étroit; couvertures tant supérieures qu'inférieures des ailes d'un bleu azur, très brillant; remiges et grandes couvertures bordées extérieurement de bleu vif; la queue large étagée latéralement, a toutes les pennes d'un bleu foncé, les quatre latérales de chaque côté sont terminées, comme dans la *Perruche omnicolore* de Vaillant, par une couleur azurée blanchâtre; les couvertures du dessous de la queue sont rouges; les pieds noirs, et le bec d'un gris de plomb. Longueur totale 11 pouces. On le trouve à Arnheimsland sur la côte nord de la Nouvelle Hollande.

Cette espèce nouvelle, dédiée à Monsieur Robert Brown, qui en a rapporté un individu, est plus petite que *Psittacus eximius* de Lath. *Supp.*; mais elle a le plus de rapports avec cet oiseau qui est la *Perruche omnicolor* de Vaill. *Perr. pl.* 28. Elle vient se ranger dans le même groupe que les trois précédentes.

PSITTACUS *multicolor*. PERRUCHE *multicolor*.

Un large bandeau d'un jaune d'or s'étend sur le front; celui-ci est suivi par un large espace d'un vert pur, qui se nuance en rougeâtre, dont la couleur domine sur le sommet de la tête; le reste des plumes de la tête, le dos, les pennes secondaires des ailes les plus proches du corps, les joues, le cou et la poitrine sont d'un vert brillant; sur le croupion sont trois bandes transversales;

versales ; la supérieure d'un vert très clair, la suivante d'un vert foncé, et l'inférieure rougeâtre ; le ventre est d'un beau jaune, qui passe par demi-teintes en orange vif ; couleur, dont le bout de toutes les plumes est terminé ; l'abdomen et les couvertures du dessous de la queue sont d'un jaune clair ; le poignet de l'aile est de couleur aurore, et les grandes pennes sont bordées de bleu foncé ; les deux pennes du milieu de la queue sont bleues, les autres sont vertes à leur origine ; elles portent une bande noire vers le milieu de leur longueur, et toutes sont terminées de bleu clair ; les ailes en dessous sont d'un bleu foncé ; les pieds sont bruns, et le bec cendré. La longueur totale de cette belle espèce est de 10 pouces 6 lignes ; on la trouve à Spencer's Gulf à la côte sud de la Nouvelle Hollande.

Le seul individu que j'ai vu a été présenté à la Société par Mr. Robert Brown ; il fait partie de ses découvertes. Cette Perruche est modelée sur les formes de *Psittacus eximius* de Lath., ou *Perruche omnicolore* de Vaill. ; mais elle est moins grande dans toutes ses dimensions.

Psittacus *icterotis*. Perruche *à joues jaunes.*

Cette espèce nouvelle ne fait point partie du cabinet de la Société, elle se trouve dans ma collection. J'en fais mention ici, parceque sa description complette la petite série des Perruches de la Nouvelle Hollande à queue large et étagée.

Sommet de la tête, nuque, cou, et toutes les parties inférieures d'un rouge très pâle, se nuançant sur les flancs par demi-teintes en jaune verdâtre ; plumes des joues d'un jaune vif ; dos et ailes d'un vert clair, et cette couleur bordant toutes les plumes dont le milieu est de couleur brune ; bord extérieur des ailes et base des remiges d'un bleu clair ; les quatre pennes du milieu de la queue et la base de toutes les pennes latérales sont d'un vert très clair ; ces derniers sont d'un bleu céleste sur la reste de leur longueur,

longueur, et ont des bouts blancs ; le bec est très petit, de couleur cendrée, les tarses sont assez longs, et plus proportionnellement aux formes totales, que dans toutes les autres Perruches indiquées dans ce mémoire. La longueur totale n'est que de 10 pouces 6 lignes.

Cette espèce est des environs de Port Jackson à la côte orientale de la Nouvelle Hollande ; elle se rapproche le plus de la *Perruche de Brown* et de la *Perruche omnicolor*, mais les tarses sont plus longs que chez ces espèces. Les femelles paroissent différer des mâles par le rouge moins pur des parties inférieures. Deux individus que j'ai vu chez des marchands à Londres, ceux de mon cabinet, et celui d'un Muséum de Paris, ne diffèrent entre-eux que par le rouge moins pur dans les uns que dans les autres, mais toujours ce rouge d'une teinte très pâle.

PSITTACUS *venustus*. PERRUCHE *à bandeau bleu*.

DIAGNOSE. Un bandeau bleu très étroit sur le front ; espace entre le bec et les yeux jaune vif dans le mâle, d'un vert clair chez la femelle. Toutes les couvertures des ailes d'un bleu foncé dans le mâle ; d'un bleu verdâtre chez la femelle*. Une étroite bande d'un bleu très foncé, bordée de chaque côté de bleu verdâtre, couvre le front et s'étend d'un œil à l'autre ; espace entre les yeux et le bec d'un jaune brillant ; tête, nuque, dos et croupion d'un vert sale ; joues, devant du cou et poitrine d'un beau vert clair ; ventre, flancs, abdomen et couvertures du dessous de la queue d'un jaune vif ; toutes les couvertures des ailes et le dessous de celles-ci d'un bleu de roi très vif ; remiges noires, liserées de verdâtre ; queue d'un bleu clair à son origine, toutes les pennes, excepté les deux ou les quatre du milieu, terminées

* J'ai placé ici ce signe de reconnoissance, pour distinguer la présente espèce de *Psittacus pulchellus* de Latham, que j'indique plus loin.

nées de jaune clair ; bec et pieds d'un gris foncé, iris jaune. Longueur totale 8 pouces. Le vieux mâle.

La femelle diffère du mâle, en ce qu'elle manque le jaune vif entre le bec et les yeux, qui est d'un vert jaunâtre ; que la bande frontale est d'un bleu sale ou couleur de plomb ; que le vert-clair et le jaune des parties inférieures est moins vif ; et que les couvertures des ailes sont d'un bleu foncé, avec de larges bordures verdâtres ; le reste est comme chez le mâle.

Cette espèce habite King-George's Sound à la côte sud-ouest de la Nouvelle Hollande. Le mâle et la femelle, qui font partie de ma collection, ressemblent sous tous les rapports aux deux individus du cabinet de la Société.

Comme cette nouvelle espèce paroît au premier coup d'œil avoir tant de rapports dans ses couleurs avec *Psittacus pulchellus* de Latham, j'ai cru utile d'indiquer, en peu de mots, les signes précis de reconnoissance et les synonymes de cette dernière espèce.

Psittacus *pulchellus* Lath. Perruche *Edwards* Vaill.

Diagnose. Face et joues d'un bleu d'aigue marin, brillant dans le mâle ; moins pur chez la femelle ; couvertures des ailes en partie couleur de sang et bleues dans le mâle ; d'un bleu clair chez la femelle. La longueur totale de cette espèce, décrite dans Latham, est de 9 pouces.

C'est *Psittacus pulchellus* Lath. *Ind. Orn. Supp. v.* ii. *p.* 21. *sp.* 5. *le vieux mâle.—Psittacus chrysogaster* Lath. *Ind. Orn. v.* i. *p.* 97. *sp.* 45. paroît le double emploi ou plutôt le jeune de cette espèce.—La seule femelle est indiquée sous le nom de *Perruche Edwards* Vaill. *Perroq. v.* i. *pl.* 68. dessin pris d'un individu femelle de mon cabinet ; où le mâle ne se trouvoit point encore à l'époque que Mr. Vaillant composoit son histoire naturelle des

Perro-

Perroquets. Voyez aussi pour le vieux mâle, Shaw *Miscell.*, *v.* iii. *t.* 96.

Le genre *Columba* de Linné, dont j'ai fait connoître par la Monographie publiée sous le titre d'*Histoire Naturelle des Pigeons et des Gallinacés*, toutes les espèces connues à cette époque, se trouve encore augmenté par six espèces découvertes très récemment à la Nouvelle Hollande.

A cette addition vient encore se joindre quatre espèces inconnues du Brésil et trois autres des Moluques; qui, ajoutées aux quatre-vingt sept espèces décrites dans mon ouvrage, parmi lesquelles se trouvent vingt et unes nouvelles, porte le nombre total des oiseaux qui composent ce genre à cent espèces distinctes; dont les Pigeons indiqués sous le nom de Colombar forment une section, les Colombes et les Colombi-gallines la seconde. Tous les Pigeons nouveaux qui font partie de ce mémoire viennent se grouper avec les Colombes proprement dites.

Ceux qui aiment à multiplier les genres par les plus légères différences, peuvent, si bon leur semble, former un grand nombre de genres nouveaux; mais lorsqu'ils auront vu en nature les cent espèces qui composent celui-ci, ils se décideront, je suppose, à abandonner ce plan de reforme dans ce genre comme dans tant d'autres, qu'ils ne parviendront jamais à diviser par des caractères exclusifs.

Les Colombars, lorsque nous connoîtrons mieux leur genre de vie, pourraient à la rigueur former un genre; mais j'observe qu'alors on trouvera dans mon Colombar Jojo, *Columba vernans* de Lath., et dans ma Colombe vlouvlou, *Columba holosericea*, ainsi que dans *Columba ænea*, *dilopha*, et *nicobarica*, les passages, sans intervalle assignable et sans caractères exclusifs, des Colombars aux Colombes proprement dites; et qu'ainsi faisant, il

 faudrait

faudrait se résoudre à former de ces quatre espèces citées en dernier, autant de genres distincts ; vu qu'il sera également impossible de les rapporter à l'un de ces groupes ; et qu'ils ont chacun de très légers caractères particuliers, qui s'opposeront à leur réunion. Il en est de même des Colombes à ailes arrondies, dont on pourroit former aussi trois ou quatre genres, et plus, suivant la caprice.

Columba *dilopha.* Colombe *à double huppe.*

Deux huppes distinctes caractérisent cette espèce de toutes celles que nous connoissons. La première huppe se forme sur le front, et commence à la partie supérieure du bec, entre les narines ; les plumes de cette première huppe sont comprimées et se recourbent en faucille sur les plumes couchées du sommet de la tête ; l'occiput est orné d'une seconde huppe touffüe, composée de plumes à barbes deliées, qui sont très étroites à leur origine, mais deviennent larges à leur extrémité ; toutes les plumes de la nuque et de la poitrine portent une double échancrure ; caractère qu'on retrouve dans plusieurs Pigeons d'Afrique et des Indes, mais toujours à échancrure simple à chaque plume.

La première huppe ainsi que presque tout le plumage de ce singulier oiseau est d'un gris couleur de cendres, plus foncé sur les ailes et sur le dos que sur les autres parties du corps ; la seconde huppe ou huppe occipitale est d'un roux foncé, mais toutes les plumes sont noirâtres à leur base ; les remiges et les pennes de la queue sont d'un beau noir ; vers le bout de la queue, qui est égale, se dessine une large bande d'un blanc grisâtre, comme dans notre Colombe ramier, *Columba palumbus* ; les tarses sont couverts de plumes jusqu'à la moitié de leur longueur, le reste du tarse et les doigts sont d'un beau pourpre ; le bec, qui est un peu fort et légèrement renflé à la pointe, est rougeâtre ; l'iris est d'un

beau

beau rouge; la longueur totale est de 15 pouces. On la trouve à la Nouvelle Hollande, vers Red Point, dans l'intérieur des terres.

Je tiens un individu, pareil en tout à celui de la Société, des soins obligeans de mon ami Mr. Brooks, anatomiste distingué. —L'espèce a le plus de rapports, dans toutes ses formes, avec *Columba spadicea* de Lath. *Ind. Supp.*, ou ma *Colombe géant*, *pl.* 1. très voisin de notre ramier, mais qui a la queue un peu fourchue, tandis que celle-ci a toutes les plumes égales, comme notre ramier: son bec est un peu plus fort que celui de la *Colombe géant* et un peu plus renflé vers le bout; la *Colombe géant* n'a point de huppe, et celle-ci en a deux; elle a toutes les plumes du cou et de la poitrine à échancrures, tandis que l'autre les a arrondies au bout.

Ce sont là toutes les différences qu'il est possible de trouver entre ces deux oiseaux. Si on les juge propres à constituer un genre distinct, je consens alors que cet oiseau figure dans le nouveau genre que les novateurs veulent lui assigner; et ainsi faisant le genre de ceux-ci, répondront, sous peu, à ce que nous désignons par le nom d'espèces.

COLUMBA *magnifica*. COLOMBE *magnifique*.

C'est à juste titre qu'on peut donner à cet oiseau le nom de magnifique; son plumage brillant le distingue parmi tous ses congénères.

Un cendré pur couvre toute la tête, les joues, ainsi que toute la nuque; cette couleur confond, vers le dos, par demi-teintes, avec le vert brillant dont toutes les autres parties supérieures sont colorées; l'éclat de cette couleur est relevé par un grand nombre de taches d'un jaune vif, disposées en longueur sur toutes les couvertures des ailes; pennes secondaires et remiges d'un vert foncé chatoyant, toutes les pennes de la queue, qui est longue

longue et arrondie, ont aussi les mêmes reflets, et présentent, sous certain jours, l'éclat brillant de plumes des Jacamars; depuis la gorge, s'étend sur le devant du cou et jusques à la poitrine, une large bande d'un violet pourpré, changeant sous certains jours en vert saphirin; cette couleur occupe plus d'espace sur la poitrine et couvre tout le ventre; les côtés de la poitrine sont du même vert que le dos; l'abdomen, les cuisses, et les couvertures du dessous de la queue, sont d'un jaune foncé ou couleur d'ocre, dont on voit aussi des teintes répandues sur les flancs; toutes les couvertures du dessous des ailes sont d'un jaune d'or; la queue en dessous est cendrée, les pieds sont bleuâtres, et le bec est brun, mais rougeâtre vers la pointe; le tour des yeux est nu et rouge; l'iris est aussi de cette couleur. La longueur totale est de 16 pouces.

Ce Pigeon se nourrit principalement de la baie de l'arbre nommé *Cabbage-tree*; sa chair est très savoureuse. Il est natif de la côte orientale de la Nouvelle Hollande, en face des cinq îles, proche de Red-point. Les formes totales de cette Colombe sont absolument les mêmes que celles de *Columba ænea* Lath. *Ind. Ornit. v.* ii. *p.* 602. *sp.* 33. ou ma *Colombe muscadivore*, *pl.* 3. son plus proche voisin, qui habite aux Moluques.

M. MacLeay, Secretaire de la Société, entomologiste distingué, me fit l'amitié, pendant mon sejour à Londres, de m'offrir un superbe individu de l'oiseau mentionné.—Je m'estime heureux d'être dans l'occasion de pouvoir témoigner publiquement mes remercimens à cet ami.

Columba *leucomela*. Colombe *leucomèle*.

Toute la tête, le cou et la poitrine sont d'un blanc pur, à legers reflets sur les côtés du cou. Le ventre et les autres parties inférieures sont d'un blanc sale, qui se nuance en cendré sur les flancs et aux cuisses; milieu du dos et croupion d'un riche pourpre

pre

pre foncé à reflets; de semblables reflets pourprés servent de bordure à toutes les plumes des scapulaires qui sont du reste d'un noir profond; quelques unes des couvertures des ailes ont aussi des bords métalliques très étroits; tout le reste des ailes, les remiges et la queue sont d'un brun mat presque noir; les pieds et le bec sont d'un jaune clair, et la queue est à pennes d'égale longueur. Ce Pigeon approche de la taille du ramier, dont il a absolument toutes les formes; on le trouve à la côte nord de la Nouvelle Hollande. Le seul individu que j'ai vu a été tué par M. Westall, et présenté par lui à la Société.

COLUMBA *scripta.* COLOMBE *marquetée.*

Tête, nuque, cou, toutes les parties supérieures du corps et des ailes ainsi que les deux pennes du milieu de la queue d'un brun-cendré; quelques taches d'un vert opalin, changeant, sous certains jours, en pourpre et en violet, sont répandues, en petit nombre, sur les couvertures des ailes; la gorge est blanche, et ce blanc est encadré par une bande noire; deux autres espèces également d'un blanc pur couvrent les joues, et sont chacunes encadrées par une semblable bande d'un noir profond, ce qui produit une espèce de marquetterie sur ces parties; la poitrine et le milieu de ventre sont d'un cendré bleuâtre; les flancs, l'abdomen et le dessous des ailes sont blancs; la queue, qui est courte, a toutes les pennes d'égale longueur; celles du milieu ont la couleur du dos, mais les autres sont d'un brun cendré depuis leur origine jusqu'à la moitié de leur longueur, le reste est d'un noir profond; les remiges sont d'un brun cendré, le bec est noir, et les pieds sont bruns. La longueur totale est de 9 pouces 6 lignes.

Cette description est prise d'un vieux mâle; l'individu de la Société me paroît ou femelle ou jeune mâle, vu que les taches opalines des ailes sont peu marquées et à reflets peu éclatants. On

On trouve cette espèce à Shoalwater-bay 22 degré de latitude sud à la côte orientale de la Nouvelle Hollande. Les formes de la *Colombe marquetée* se rapprochent le plus de *Columba Jambos* Lath. *Ind. Orn. v.* ii. *p.* 598. *sp.* 18. ma *Colombe Jambo, pl.* 27 et 28, qui vit dans l'île de Sumatra. L'individu du cabinet a été offert à la Société par M. Robert Brown.

COLUMBA *humeralis*. COLOMBE *à collier roux*.

La face, les joues, la gorge et la poitrine sont d'un bleuâtre cendré ; les autres parties inférieures sont d'un blanc vineux plus foncé sur les flancs ; du blanc pur règne sur l'abdomen et aux couvertures du dessous de la queue ; l'occiput, le dos, le croupion et toutes les couvertures des ailes sont d'un brun cendré, toutes les plumes des parties indiquées étant terminées par une bande transversale d'un noir profond ; sur la nuque se dessine un large collier d'un roux orange, dont les plumes sont également terminées par une bande noire ; la queue est large à sa base, longue et étagée ; les pennes latérales sont d'un brun pourpré ou vineux, toutes terminées de blanc pur, les deux pennes du milieu seules exceptées, qui sont de la couleur du dos et n'ont point le bout blanc ; les remiges sont brunes, mais d'un roux vif sur les barbes intérieures, ce qui fait que l'aile est toute rousse intérieurement ; le tour des yeux est dénué de plumes ; les pieds sont jaunes, et le bec est d'un jaune bleuâtre. La longueur totale est de dix pouces.

M. Brown, qui a offert un individu à la Société et un autre semblable au Muséum Britannique, a trouvé cette nouvelle espèce à Broad Sound a la côte orientale de la Nouvelle Hollande. La Colombe du présent article a la plus de rapports avec le *Columba tigrina* de mon *Histoire de Pigeons, pl.* 43. et ne diffère point dans ses formes avec *Columba picturata* et autres du nouveau monde.

COLUMBA

COLUMBA *phasianella.* COLOMBE *phasianelle.*

Cette Colombe, caracterisée par la forme de sa queue longue et cuneiforme, diffère seul en cela de ses congénères de la Nouvelle Hollande.

Parties supérieures d'un brun roussâtre terne, qui prend une teinte marron sur le sommet de la tête, et se peint en reflets verts et pourprés sur les côtés du cou; nuque rayée transversalement de larges bandes brunes et d'étroites bandes rousses; les pennes des ailes, qui sont d'un brun terne, portent sur les bords extérieurs des barbes et à leur extrémité une teinte d'un roux marron; queue très longue et très conique; toutes les pennes du milieu sont d'un brun roussâtre sombre, comme les plumes du croupion; les latérales d'un roux vif, sur lequel se dessine une large bande noire qui traverse ces pennes vers le milieu de leur longueur; la gorge est rousse; les autres parties inférieures sont d'un brun pourpré, rayées transversalement de zigzags noirs, très étroits; flancs, cuisses et couvertures du dessous de la queue d'un marron vif, sans taches ni raies. Le bec et les pieds sont d'un brun rougeâtre. Longueur totale 14 pouces 6 lignes. Elle vit à la Nouvelle Hollande, dans l'intérieur, vers le Port Jackson.

Sir John Jameson, qui a rassemblé beaucoup d'objets d'histoire naturelle à la Nouvelle Hollande, fit hommage de cette espèce à Sir Everard Home, Bart. qui l'offert à la Société. L'espèce de cet article a le plus de rapports avec *Columba migratoria* Lath. *Ind. Orn. v.* ii. *p.* 612. *sp.* 70. ma *Colombe voyageuse*, *pl.* 48 et 49. Elle ressemble en tout à cet oiseau, et à tous ceux à longue queue étagé de l'Amérique septentrionale.

Je termine ici cette notice sur les Pigeons nouveaux du cabinet de la Société, qui ont été découverts à la Nouvelle Hollande,

 depuis

depuis la publication de mon ouvrage, en observant; que hormis les espèces nouvelles du Brésil, et celles trouvées récemment aux Moluques, je n'ai rien à ajouter ou à changer à mes descriptions, telles qu'elles sont publiées; excepté, que je sollicite de corriger l'erreur faite à l'article de *Columba purpurata*, edit. 8vo. *p.* 280, et folio *pl.* 34 et 35. où j'ai dit, que la *Colombe Kurukuru*, variété *pl.* 35. est identique avec celle de la *pl.* 34. J'ai trouvé, et me suis assuré depuis, que cette variété supposée est une espèce distincte, dont les caractères sont toujours les mêmes, et différens de mon Kurukuru.

Je sollicite qu'on veuille bien prendre note de cette erreur jusqu'à la publication du Supplement à mon *Histoire des Pigeons et des Gallinacées.* Je me servirai pour cette espèce, à ajouter au Catalogue des Pigeons, du nom de *Columba porphyracea,* sous lequel elle a été indiquée dans les dessins originaux de Forster. Elle est aussi de la Nouvelle Hollande.

XIII. *De-*

Glareola Pratincola.

I. Curtis sculp.

XIII. *Descriptions of three Species of the Genus Glareola. By William Elford Leach, M.D. F.R.S. and L.S.*

Read May 2, 1820.

GLAREOLA.

GLAREOLA, *Brisson, Latham, Cuvier.*

* *Cauda furcata.*

Spec. 1. GLAREOLA PRATINCOLA.

G. cinereo-brunnea, ventre cruribus uropygio gulaque albidis; hâc (quandoque sordide flavida) linea nigra circumdata, cauda nigra, basi albida.

TAB. XII. Fig. 1.

Hirundo Pratincola. *Linn. Syst. Nat.* i. 345.
Glareola. *Briss. Ornith.* v. 141. *t.* 12. *f.* 1.
Glareola austriaca. *Lath. Ind. Orn.* 753.
Glareola torquata. *Meyer* ii. 404.
Tem. Man. d'Orn. 352.

TAB. XII. Fig. 2.

JUNIOR.
Glareola nævia. *Gmel. Syst. Nat.* i. 695.
Lath. Ind. Orn. 754.
Steph. Gen. Zool.
Glareola Senegalensis. *Gmel. Syst. Nat.* i. 695.
Lath. Ind. Orn. 754.
Steph. Gen. Zool. xi.

 Habitat

Habitat in Europa australi; rarior in Helvetia et in Gallia boreali; rarissimè in Hollandia et Anglia.

Color in junioribus cinereus rufescente nigroque varius; cauda nigra rufo terminata; gula violascente-rufa; venter albus; rostrum pallide rufescens.

Axillæ in adultis rufæ.

The young bird described above was killed near Arles in the South of France by Baron de Laugier, who deposited it in the *Jardin des Plantes*. In this state there is no black surrounding the spot on the throat.

Spec. 2. Glareola orientalis*.

G. cinereo-fuscescens, ventre caudaque albis; hâc ad apicem nigrâ, gulâ nigro irregulariter circumdatâ, rostro nigro.

Tab. XIII. Fig. 1. *Mas*. Fig. 2. *Fœm.*

Habitat in Java.

Mus. *Hist. Nat. Gall.* ♂, ♀.

Remiges nigræ. Venter maris antice rufescens; fœminæ albidus. Gula rufescens in mare, albida in fœmina. Humeri in adultioribus albo-notati.

** *Cauda truncata.*

Spec. 3. Glareola australis.

G. rufescente-flavida, caudâ uropygioque albis; illâ fasciâ supra nigrâ, gulâ pallidiore, cruribus ventreque fasciâ abdominali rufis, rostro testaceo ad apicem nigro.

Tab. XIV. Fig. 1. *Mas*. Fig. 2. *Fœm.*

Habitat in Australasia.

Mus. *Hist. Nat. Gall.* ♂, ♀.

It is probable that *Glareola Isabella* of Vieillot (*Dict. d'Hist. Nat.* xiii. 221.) belongs to this second division of the genus.

* I observed in the museum of the *Jardin des Plantes* a specimen of a bird from China very nearly allied to *G. orientalis*, but differing in having the mark on the throat and the anterior part of the belly paler in colour.

XIV. *Sy-*

Glareola Orientalis.

J Curtis sculp

Glareola Australis.

I. Curtis sculp

XIV. *Systematic Arrangement and Description of Birds from the Island of Java.* *By Thomas Horsfield, M.D.*

Read April 18, 1820.

In the following essay a systematic arrangement of a collection of birds from Java has been attempted. The subjects from which the descriptions were made are placed in the Museum of the Honourable East India Company, where they may freely be inspected. With the exception of a small number, they were collected between the years 1811 and 1817, the period during which this island formed part of the British possessions in India. It is chiefly on this consideration that I am induced to offer to the Linnean Society of London this essay, in its present state, containing merely a concise characteristic description of the subjects. It is also my duty to show to the naturalists of England, without delay, the liberal provision that has been made by the Court of Directors of the Honourable East India Company in their Museum at the East India House, for the preservation of various objects of natural history from the Indian archipelago, collected during the period above mentioned under the patronage of the Honourable Sir T. S. Raffles, when Governor of Java and its dependencies.

I wish further to represent a view of the subject of the natural history of the Eastern Islands, relating particularly to the present period. Although during the last two centuries few additions have been made to this science in that part of the globe, various discoveries may soon be expected in every department.

Since

Since the transfer of Java to the same nation which governed the greatest portion of it subsequent to the beginning of the 17th century, a new system of conduct has been adopted in every point of view. Natural history is cultivated with ardour; royal patronage has been extended to it; and persons of ability have been engaged, and are now active in investigating Java, the Moluccas, and various other portions of the Eastern archipelago. If during the period above defined, when Java was under the protection of the British nation, my humble labours as a collector have in any manner increased our acquaintance with the natural productions of the Indian archipelago, I shall consider myself highly favoured if I may make my first report to the scientific public by means of the Linnean Society.

The collection was made on Java without any attempt at a systematic arrangement. In the examination of the subjects, and in the compilation of this essay, I have to acknowledge the assistance which I have received from Dr. Leach. In the disposition of the families I have followed the order adopted by that celebrated naturalist in the arrangement of the objects of ornithology at the British Museum. The *Manuel d'Ornithologie* of Temminck has been my guide in regard to most of the genera, and it is the last edition of that book to which I frequently refer. Several genera are taken from Cuvier's *Règne Animal*, where they are employed either as genera or as sub-genera; and a few new genera have been constructed, the distinguishing characters of which it has been my endeavour to point out with perspicuity.

Ordo

Ordo I. ACCIPITRES.

Fam. II. Falconidæ *Leach.*

Plumicolles *Duméril.*

Gen. 1. Falco, *Linnæus, Cuvier, Bechstein, Temminck.*

* Falcones proprie sic dicti *Bechst.* Falco *Savigny.*

Spec. 1. *Falco cærulescens* Linn.

Little black and orange Indian Hawk. *Edw. t.* 108.
Allap sive *Allap-allap* Javanis.

6 pollices longus.

The drawing of Edwards was made from a bird sent from Bengal. The Javan specimens are somewhat smaller, and differently marked.

They appear to form a distinct variety, to which the following description applies:

Corpus supra hypochondriaque nigra. *Gula*, jugulum, linea temporalis frons axillæque albæ. *Tibiæ* antice abdomenque subferrugineæ. *Remiges* et *rectrices* interne albo-fasciatæ.

Spec. 2. *Falco Tinnunculus* Linn.

Allap-allap *Sapi* Javan.

Spec. 3. *Falco severus* mihi.

F. supra fusco-nigricans, remigibus nigris; subtus castaneus, gula pallidiore.

Allap-allap *ginjeng* Javan.

Longitudo $10\frac{1}{2}$ poll.

Tectrices alarum, cauda et rectrices apicibus castaneis.

** Aquilæ

** Aquilæ *Bechstein, Temminck.*

a. Les Aigles Pêcheurs *Cuv.* Haliætus *Savigny.*

Spec. 4. *Falco Pondicerianus* Gmel.

Aquila ponticeriana. *Brisson.* i. *p.* 450. *Pl. Enl.* 416.
Ulung Javanis.

b. Les Balbusards *Cuv.* Pandion *Savigny.*

Spec. 5. *Falco Ichthyætus* mihi.

F. fuscescens, ventre postice crisso cauda cruribusque albis, cauda apice nigrescente.
Jokowuru Javanis.

Longitudo 2 ped. 4 poll.

Caput griseum, gula albida. Collum griseo-fuscescens. Pectus et abdomen pallide subferrugineo-fuscescentia. Remiges perfuscæ.

As this section of the second division of Falcons, the Balbuzards, possesses some peculiarities of character, I here add the detailed description of our bird.

Rostrum longum: *maxilla* ultra medium abrupte adunca, ungue longo, tomia marginibus fortiter flexuosis. *Mandibula* apice oblique truncata. *Nares* magnæ subtrapeziformes. *Cera* supra nuda lateribus pilis adspersa. *Alæ* breves: remex prima integra brevis; secunda tribus sequentibus (quæ longiores sunt, subæquales et tenuiter interne et externe emarginatæ) paulo brevior, et fortiter interne emarginata. *Cauda* longissima subrotundata. *Pedes* elongati validi; *tarsi* basi plumis paucis densis vestiti. *Digiti* longi, medio longiore lateralibus subæqualibus. *Ungues* longi fortius curvati, teretes, ăttenuati, acutissimi, medio interne sulcato; anteriorum internus maximus, externus minimus, hallucis medio antico major.

Cuvier

The illustrious M. Cuvier, in his definition of the Balbuzards, asserts that "*leurs ongles sont ronds en dessous,*" a character which applies strictly to the cylindrical claws of our bird; while "*dans les autres oiseaux de proie ils sont creusés en gouttière.*"

*** ASTURES *Bechstein, Temminck.*

Les AUTOURS *Cuvier.* DÆDALION *Savigny.*

Spec. 6. *Falco Soloënsis* mihi.

F. supra plumbeo-cinereus, infra sordide ferrugineus, remigibus nigris, tectricibus basi albis, rectricibus (externis exceptis) nigro-fasciatis, subtus albidis.

ALLAP-ALLAP *lallár* Javanis.

Longitudo 11 poll.

**** MILVI *Bechstein, Temminck.*

Les MILANS *Cuvier.*

Spec. 7. *Falco melanopterus* Daudin.

Elanus cæsius. *Savigny Ois. d'Egypte,* 98. *pl.* 2. *fig.* 2.
Elanus melanopterus. *Leach Zool. Misc. v.* iii. *p.* 4. *t.* 122.
Angkal-Angkal Javanis.

The under parts of the body and of the tail in my specimens are perfectly white; and the upper part of the tail is much paler than in those from Africa.

Two specimens of this bird, in the museum of the Linnean Society, were brought from New Holland.

**** INCERTÆ SEDIS.

Spec. 8. *Falco Bido* mihi.

F. fuscus, capite supra remigibus caudaque nigris; plumis cristæ capitis

capitis atris basi albis; cauda fascia lata albida, alis subtus abdomine crisso cruribusque albo guttatis.

Bido Javanis.

Longitudo 24 ad 26 poll.

Rostrum mediocre, basi rectum deinde fortiter arcuatum, lateribus subconvexis, *ungue* mediocri, *tomiis* parum curvatis. *Cera* latiuscula. *Nares* oblongæ subobliquæ. *Mandibula* pone apicem obsolete excisa. *Alæ* cauda breviores. *Remiges* quinque primæ interne profunde secunda ad septimam externe emarginatæ, prima brevissima, secunda duabus sequentibus paulo brevior, quarta longissima, tertia et quinta æquales. *Primores* interne fasciatæ; fasciæ subtus albæ supra fuscescentes. *Cauda* rotundata elongata. *Pedes* subelongati; *tarsi* basi subplumosi, acrotarsia squamis hexagonis reticulata. *Digiti* breves: medio longiore, exteriore breviore. *Ungues* subelongati; medio, interiore, halluce subæqualibus, exteriore brevissimo.

Spec. 9. *Falco Limnæetus* mihi.

F. fuscus, cauda subtus præter apicem albido-cinerea, tarsis usque ad extremitatem dense plumosis.

Wuru-rawa Javanis.

Rostrum breve a basi ad apicem æque arcuatum, compressum, *ungue* elongato, *tomiis* maxillaribus valde curvatis. *Mandibula* subintegra apice oblique truncata. *Cera* angusta. *Nares* ovatæ magnæ transversim positæ. *Alæ* cauda breviores. *Remiges* 1—6 interne, 2—7 externe emarginatæ; 1 abbreviata, 2 et 3 gradatim longiores; 4 et 5 longiores æquales, reliquæ gradatim breviores. *Pedes* elongati: *tarsi* ad extremitatem usque dense plumosi. *Ungues* parvi, anteriores subæquales, halluce medio vix majore.

A short strongly compressed and strongly curved beak, tarsi closely covered with plumes throughout their whole length, small claws,

claws, and those of nearly equal size on all the toes, form the prominent characters of this bird.

The border of the upper mandible is curved nearly as in *Falco Pondicerianus*; the apex is sharp. This is a scarce bird. I found it but once at the extensive lakes, formed during the rainy season in the southern parts of the island, where it feeds on fishes. I never met with it along the extensive northern sea-coast.

Fam. III. STRIGIDÆ *Leach.*

NOCTURNÆ *Duméril.*

Gen. 2. STRIX. *Linnæus, Cuvier, Bechstein, Temminck.*

Spec. 1. *Strix Javanica* Gmel.

Strix Javanica. *De Wurmb. Lichtenb. Mag.* 10, 2. 10.
Daris (*Deris*) Javanis. *Serrák* Malayis.

This bird appears to be a mere variety of the *Strix flammea* of Linnæus. The tail is rather longer and stronger than in the European specimens of the latter that I have examined.

The white variety is said occasionally to occur in Java.

Spec. 2. *Strix badia* mihi.

S. badia nigro punctata, subtus pallidior, capite antice gulaque albidis badio variis.

Wowo-wiwi Javanis.

Longitudo 11 poll.

Pedes lanuginosi pallide castanei.

Spec. 3. *Strix Selo-puto* mihi.

S. supra badio-ferruginosa fasciis transversis obsoletioribus, subtus alba fasciis ferruginoso-badiis saturatioribus.

Selo-puto Javanis.

Longitudo 20 poll.

Remiges rectricesque obsolete fasciatæ; *gula* albida, *jugulum* flavescens; *regio ocularis* pallide-ferruginosa; *pedes* sordido flavo-nigrescente fasciolati.

Spec. 4. *Strix rufescens* mihi.

S. rufescens, supra nigro pallidoque infra nigro maculata, pectore linea nigra lunulato.

Kokko-Blo Javanis.

Longitudo 8 poll.

Spec. 5. *Strix castanoptera* mihi.

S. griseo et nigricante transversim lineolata, scapulis dorsoque castaneis, ventre albo castaneoque vario.

Blo-*watu* Javanis.

Longitudo 8 poll.

Remiges et rectrices castaneo fuscescentes, griseo-testaceo fasciatæ. Scapularum margines tæniaque longitudinalis medio alarum albæ.

Spec. 6. *Strix Lempiji* mihi.

S. supra fusco et nigro-flavescente variegata, subtus pallido-ferrugineo nigricante nebulosa, remigibus pallidiùs fasciatis, capite aurito.

Lempi-ji Javanis.

Longitudo 9 poll.

Spec. 7. *Strix orientalis* mihi.

S. supra fusca, ferrugineo fasciata, humeris axillis abdomine tarsisque albis fusco fasciatis, capite aurito.

Longitudo 2 ped.

Spec.

Spec. 8. *Strix Ketupu* mihi.

S. ferruginea, supra perfusco varia, subtus nigro lineata, remigibus rectricibusque fuscis ochroleuco fasciatis, capite aurito.

Blo-*ketupu* Javanis.

Longitudo 21 poll.

Rostrum procerum (aliis hujus generis magis productum) maxilla basi recta, ultra medium arcuata, mandibula apice utrinque emarginata. *Cera* magna. *Nares* obliquæ. *Alæ* cauda paulo breviores. *Remiges:* 1 brevis, 2 gradatim, 3 abrupte increscentes; 4, 5, 6 longiores. *Pedes* elongati. *Tarsi* nudi reticulati. *Digiti* robusti.

Ordo II. PASSERES.

Fam. IV. Hirundinidæ *Leach.*

Fissirostres *Cuvier.*

Planirostres *Duméril.*

Gen. 3. Podargus *Cuvier.*

Spec. 1. *Podargus Javensis* mihi.

P. rufescente-isabellina, fusco pulverulenta, cauda undulato-fasciata.

Chaba-wonno Javanis.

Longitudo 9 poll.

Rostrum capite latius ad apicem abrupte acuminatum deflexum, maxilla inverse spatulæformis, culmine carinato. *Nares* lineares supra squama tectæ. *Alæ* cauda breviores. *Remiges* 2—6 externe emarginatæ, 1 brevis, 4 et 5 longiores, ceteræ gradatim breviores. *Ungues* subæquales simplices.

Rarissima avis.

Gen.

Gen. 4. CAPRIMULGUS *Linnæus.*

Spec. 1. *Caprimulgus affinis* mihi.

C. nigro fusco et ferrugineo variegatus, remigibus fuscis, tribus externis fascia alba, reliquis ferrugineo griseoque variegatis, rectricibus duabus externis interne albis.

Chaba Javanis.

Longitudo 9 poll.

Allied to *Caprimulgus Asiaticus* of Latham.

Remiges prima interne solummodo, 2 et 3 utrinque fasciatæ. Fascia gularis alba.

Spec. 2. *Caprimulgus macrurus* mihi.

C. ferrugineo nigricanteque nebulosus, striga verticali tæniisque tectricium aterrimis, cauda corpore longiore cuneata.

Longitudo corporis $4\frac{3}{4}$; caudæ $5\frac{1}{4}$ poll.

The four internal tail-feathers are terminated by a broad whitish ferruginous band; a similar band extends across the middle of the wing, formed as in other species by irregular marks on the quill-feathers.

This species is strikingly distinguished by the length of the tail, and by the regular disposition of the rigid vibrissæ pointing forward; white at the base with a black extremity. On the throat it has a whitish band.

Gen. 5. HIRUNDO *Linnæus.*

Spec. 1. *Hirundo esculenta* Osb. It.

Hirundo nidis edulibus. *Bont. Jav.*

Lawet Javanis.

The specimens which I examined in Java and those which I brought with me differ from Latham's description in being uniformly

formly of a blackish colour, without a white extremity to the rectrices. See *Ind. Orn.* 580.

Spec. 2. *Hirundo fuciphaga.* Act. Holm. 33. p. 151.
Linchi Javanis.

Longitudo 5 poll.

This species differs from the former in being nearly an inch shorter, and in having a white abdomen and longer wings in proportion to its size. Its nest is constructed of mosses and lichens, connected with the same gelatinous substance which composes the edible nest of the preceding species.

Spec. 3. *Hirundo Klecho* mihi.

H. viridi-nigra, remigibus caudaque obscurioribus, dorso postice griseo: subtus cinerea.
Samber-galeng Javanis.

Longitudo $8\frac{1}{2}$ poll.

In young birds the abdomen is whitish, and the wing-coverts are banded with white at their extremities. The feathers covering the back and the quill-feathers are tipped with brownish-grey.

Fam. V. SYLVIADÆ *Leach.*

DENTIROSTRES *Cuvier.*

Gen. 6. LEPTOPTERYX.

OCYPTERUS* *Cuvier.*

* It may be necessary to state the reason for not adopting a name of so high authority. A genus *Ocyptera* has been established in entomology by Latreille, in the edition of his *Genera Insectorum,* &c., published in 1809. As the name employed in ornithology differs only in termination, I have taken the liberty to substitute *Leptopteryx,* which equally applies to the character of this bird.

Spec.

Spec. 1. *Leptopteryx leucorynchos.*

Lanius leucorynchos *Linn.*
Lanius dominicanus. *Son. Voy. N. Guin. pl.* 25.

Longitudo 7 poll.

Dorsum fuscescens, *uropygium*, *pectus axillæ*, *abdomen*, *crissum*que alba. *Remiges* et *rectrices* externe perfuscæ griseo pulverulentæ, subtus pallidiores. *Rostrum* capitis longitudine, acuminatum conicum subarcuatum, *maxilla mandibula*que utrinque emarginatæ. *Nares* laterales lineares basi plumis rigidis tectæ. *Pedes* breves. *Acrotarsia* squamata. *Digiti* breves. *Alæ* longissimæ. *Remex* prima spuria minima, 2—3 longissimæ, ceteræ gradatim breviores. *Cauda* mediocris truncata, *rectricibus* 12.

Gen. 7. Lanius *Linn.*

Spec. 1. *Lanius Bentet* mihi.

L. fronte lateribus colli alis caudaque nigris vertice dorsoque griseis, uropygio et corpore subtus rufo badiis, rectricibus apice albis.

Bentet Javanis.

Longitudo $9\frac{1}{2}$ poll.

Rectrices exteriores externe albidæ, *gula*, *pectus*, *abdomen*que medio pallidiores.

This bird differs from the *Lanius Lucionensis* Linn., to which it is allied, chiefly by its greater size, and by having a black forehead and a rufous *uropygium* or rump.

Gen. 8. Edolius *Cuvier.*

Spec. 1. *Edolius forficatus.*

Lanius forficatus *Linn.*
Sri-Gunting Javanis.

Spec.

Spec. 2. *Edolius cineraceus.*

E. cineraceus saturatus concolor, remigibus supra ad apicem rectricibusque lateralibus margine exteriore, nigris.

Chenta Javanis.

Longitudo 11 poll.

Although very similar to the former, it must be considered a distinct species: the bill is more robust, and the exterior rectrices form a greater curve than in *Lanius forficatus*: it is much less common, and the natives distinguish it by a peculiar name.

Spec. 3. *Edolius Malabaricus.*

Lanius Malabaricus. *Lath. Syn. Supp.* i. *p.* 56. *t.* 108.
Cuculus paradiseus. *Brisson.* iv. *pl.* 14. A. 1.

Gen. 9. CEBLEPHYRIS *Cuvier.*

Spec. 1. *Ceblephyris Javensis* mihi.

C. cinereo-griseus, abdomine fasciaque rectricium terminali albente, remigibus rectricibusque fusco-nigricantibus, pectore tenuiter griseo fasciato, capite supra lateribusque concoloribus.

Kepodang-sungu Javanis.

Cauda subforficata.

Spec. 2. *Ceblephyris striga* mihi.

C. supra strigaque post-oculari cineraceo nigricante, uropygio pallidiore, tectricibus externe remigibus interne ad basin albo marginatis, rectricibus exterioribus apice albis.

Lenjettan Javanis.

Longitudo 6½ poll.

Gen.

Gen. 10. Muscicapa *Linnæus.*

Spec. 1. *Muscicapa flammea* Gmel.

Muscicapa flammea. *Pen. Ind. Zool. t.* ix. *p.* 43.
Uwis seu *Semuttan* Javanis.

Spec. 2. *Muscicapa obscura* mihi.

M. viridi-chalybeo nigra, subtus uropygioque albis.

Longitudo 5 poll.

Variat colore griseo-fuscescente, remigibus saturatioribus, rectricibus perfuscis.

Spec. 3. *Muscicapa Indigo* mihi.

M. obscure cæsia, remigibus rectricibusque nigris, his basi axillis ventre crissoque albidis.
Nil-nilan Javanis.

Longitudo $4\frac{3}{4}$ poll.

Rectrices, exterioribus exceptis, externe obscuro-cæsio marginatæ; binæ intermediæ basi unicolores.

Spec. 4. *Muscicapa Banyumas* mihi.

M. supra saturato cyaneo nigricans, subtus badia, ventre pallidiore, remigibus rectricibusque infra nigris.
Chiching-goleng Javanis (Provinciæ Banyumas).

Longitudo $5\frac{1}{2}$ poll.

Spec. 5. *Muscicapa Javanica* Sparmanni.

Sikattan Javanis.
Muscicapa Javanica.
Mus. Carls. fasc. iii. *t.* 75.
Corpus nigricante fuscum plumis apice badiis. *Frons* fasciaque inter

inter gulam et pectus nigricantes. *Abdomen* et *crissum* sordide crocea. *Gula rectrices*que externæ apice albæ.

Longitudo 6 poll.

Gen. 11. TURDUS *Linnæus.*

Spec. 1. *Turdus hæmorrhous.*

Muscicapa hæmorrhousa β. *Gmel.*

Ketilan Javanis.

Longitudo 6½ poll.

T. griseo fuscescens, capite atro, malis jugulo abdomine uropygioque albidis; crisso croceo.

Spec. 2. *Turdus amœnus* mihi.

T. cyaneo-ater, scapulis rectricibusque tribus exterioribus albis.

Kacher Javanis.

Longitudo 8½ poll.

Remigum secundariarum duæ primæ fascia laterali alba, apice sensim attenuata, notatæ. Amœnitate cantus eximia.

Spec. 3. *Turdus macrourus* Gmel.

Long-tailed Thrush. *Lath. Syn.* iii. *t.* 39.

Larwa Javanis.

Spec. 4. *Turdus analis* mihi.

T. griseo-fuscus, vertice remigibus rectricibusque saturatioribus, subtus albidus, crisso flavo.

Chuchak Javanis.

Longitudo 7 poll.

Spec. 5. *Turdus bimaculatus* mihi.

T. olivaceo-fuscescens, gula fronteque fuscis, hac macula utrinque aurantia, malis flavidis, abdomine albido, crisso flavo.

Chuchak-gunung Javanis.

Longitudo 7 poll.

 Remiges

Remiges et *rectrices* exteriores externe olivaceo-flavo marginatæ. *Pectus* et *axillæ* albidæ. *Humeri* flavidi.

Spec. 6. *Turdus strigatus* mihi.

T. supra vinaceo-nigricans, subtus albidus vinaceo-nigrescente strigatus, remigibus rectricibusque saturatioribus, pallide marginatis.

Longitudo 6¼ poll.

Pileus lateraque capitis saturatiore colore strigati.

Spec. 7. *Turdus viridis* mihi.

T. viridis (smaragdinus) concolor, remigibus interne rectricibus subtus pallide fuscis, gula flavescente.

Ijoän Javanis.

Longitudo 8 poll.

There is a slight shade of olive in the green of the upper parts and of yellow in the lower. The bill is yellowish inclining to plumbeous.

Spec. 8. *Turdus chalybeus* mihi.

T. viridi-chalybeo nitens, remigibus rectricibusque pernigris, cauda rotundata, pennæ capitis et colli rigidæ, acuminatæ.

Sling Javanis.

Longitudo 7 poll.

I have placed this bird among the Thrushes, although it differs in some respects from the other species of the genus: the bill is considerably arched and convex at the sides, with a downy covering to the nares, approaching to that form which is exhibited by *Irena* and *Oriolus*.

Spec. 9. *Turdus Javanicus* mihi.

T. corpore fusco, striga gulari maculisque abdominalibus obscuris ferrugineis.

Bochrit Javanis.

Longitudo 8½ poll.

This

This species is nearly allied to *Turdus australis*: it differs by the dark ferruginous colour of the under parts.

Spec. 10. *Turdus varius* mihi.

T. castaneo-testaceus, pennis apice perfuscis, remigibus fuscis externe castaneo-testaceis, abdomine albido, lateribus castaneo et nigro variis, rectricibus subtus fuscescentibus, crisso albido nigroque tenuiter fasciato.

Ayam-ayaman Javanis.

Longitudo 11 poll.

Gula albida tenuissime fusco varia.

Spec. 11. *Turdus cyaneus* mihi.

T. cyaneus saturatissimus, capite remigibus rectricibus externe et subtus ventreque nigris.

Arreng-arrengan Javanis.

Longitudo $9\frac{1}{2}$ poll.

The bill and the feet are black. In the next following species the bill is yellow, but has a similar form.

This bird, and several others of this genus form a distinct subdivision, in which the bill is long, straight, and abruptly inflected at the extremity; the back (culmen) is broad, corneous, and forms a rounded prominent keel.

Spec. 12. *Turdus flavirostris* mihi.

T. niger, capite annulo collari gula jugulo pectore antice, nitore chalybeo undulatis, plumis dorsalibus basi albis, rostro flavo.

Chiung Javanis.

Longitudo 12 poll.

Spec. 13. *Turdus ochrocephalus* Gmel.

Chuchak-rawa Javanis.

Longitudo 10 poll.

Color

Color fuscescente griseus. *Remiges rectrices*que fuscæ, externe flavo violaceæ, *gula* albida, striga utrinque nigra. *Caput* testaceo flavum. *Corpus* subtus fuscescente albidoque varium. *Uropygium* sordide testaceum. *Cauda* elongata.

Spec. 15. *Turdus gularis* mihi.

T. fuscescente-olivaceus, alis caudaque ferrugineis, gula alba, abdomine flavo.

Bres Javanis.

Longitudo 7 poll.

Remiges interne fuscæ. *Vertex* griseo-ferrugineus. *Axillæ* flavescentes.

Spec. 16. *Turdus dispar* mihi.

T. remigibus rectricibusque fuscis, externe dorsoque croceo-olivaceis, capite maris atro, gula coccinea, feminæ concolore.

Chiching-goleng Javanis.

Abdomen ♂ croceum, *pectus* coccineo-*croceum* ♀ *gula pectus*que testaceo-albidæ.

Longitudo $6\frac{1}{2}$ poll.

Gen. 12. Timalia.

Rostrum mediocre, cultratum valde compressum. *Maxilla* a basi ad apicem æqualiter arcuata vix emarginata ; *culmine* rotundato inter nares alte carinato. *Nares* in fovea ovata laterali sitæ. *Alæ* breves. *Remiges:* 1 subspuria, 3—6 externe emarginatæ, 6—7 longiores, reliquæ gradatim breviores. *Cauda* elongata rotundata. *Pedes* mediocres validiusculi : *acrotarsia* scutulata. *Unguis* posticus medio antico duplo major.

This genus is allied to *Turdus,* but differs in the form of the bill and the relative robustness of the legs. The bill is narrow at the base, and uniformly compressed throughout. The sides

sides of the upper mandible are perfectly uniform and smooth, and rise to an elevated rounded back or culmen, having a slight terminal notch. In the shortness and roundness of the wings it differs from the other genera of this family, except from *Brachypteryx*, which will be described below.

Spec. 1. *Timalia pileata*.

T. subolivacea fusca, pileo castaneo, gula juguloque albis nigro lineatis, abdomine sordide testaceo.

Dawit seu Gogo-stite Javanis.

Longitudo $6\frac{1}{2}$ poll.

Remiges fuscæ, externe castaneo-fuscæ. *Rectrices* fuscæ obscurissime saturatiore colore fasciatæ. *Rhachides* pennarum jugularium nigræ.

Gen. 13. Jora.

Rostrum mediocre, rectum, validiusculum, basi latius, apicem versus subcompressum, attenuatum; *culmine* rotundato, leviter arcuato, post nares producto, apice vix inflexo, emarginato. *Tomia* subdiaphana acuta. *Nares* ovatæ, parvæ, in fovea elongata antice attenuata sitæ. *Alæ* breves. *Remiges:* 1 spuria; 4—7 externe tenuiter sinuatæ; 3—8 longiores, subæquales, 2 abrupte, 9 et sequentes gradatim breviores. *Cauda* elongata, truncata. *Pedes* mediocres, congrui. *Tarsi* digito medio dimidio longiores. *Acropodia* obscura, scutulata. *Digiti* antici debiles, medio cum externo basi coalito; hallux validiusculus, medio antico æqualis. *Ungues* compressi; antici debiles, postico valido, fortius arcuato.

This genus is distinguished by the strength and conical form of its bill from *Sylvia* and *Motacilla*. The nares are comparatively small. It has a peculiar character in the sharpness and transparency of the cutting edges of the mandibules. The anterior toes are small and the claws strongly compressed; the posterior

terior toe and claw are comparatively stout. Its food consists of insects.

Spec. 1. *Jora scapularis.*

J. olivaceo-viridi flava, remigibus nigricantibus, externe flavido, interne albo marginatis, abdomine pectoreque flavo.

Chito Javanis.

Longitudo 5 poll.

Rectrices exteriores externe pallidiores.

Gen. 14. ORIOLUS *Temminck.*

CORACIAS *Illiger.*

Spec. 1. *Oriolus Galbula* Lath.

Kepodang Javanis.

Oriolus Galbula ♂. *Ind. Orn.* 128.

Oriolus chinensis. *Linn. Syst.* i. *p.* 160.

Culiavan. *Pl. Enl.* 575.

Spec. 2. *Oriolus Xanthonotus* mihi.

O. ater, ventre albido nigro-striato, scapulis axillis uropygio crisso rectricibusque interne flavis, rostrum rubrum, pedes nigri.

Longitudo 6½ poll.

Gen. 15. MELIPHAGA *Lewin.**

PHILEDON *Cuvier.*

Spec. 1. *Meliphaga Javensis* mihi.

Chuchack-iju Javanis.

Turdus Cochinchinensis. *Gmel. Syst.* i. *p.* 825.

Turdus Malabaricus. *Gmel. Syst.* i. *p.* 837.

Le petit Merle de la côte de Malabar. *Sm. Voy. Ind.* ii. *p.* 192.

Le Verdin. *Vieillot Ois. Dor.* ii. ♂ 77. ♀ 78.

* Birds of New Holland.

Gen.

Gen. 16. Irena.

Rostrum mediocre, cultratum; maxilla apice adunca emarginata. *Culmen* arcuatum, elevatum, inter nares carinatum, utrinque a basi ultra medium usque sulco obsoleto exaratum, lateribus subconvexis. *Nares* basales subrotundæ, vibrissis rigidis plumisque velutinis obtectæ. *Alæ* cauda breviores. *Remiges* 2—6 externe emarginatæ, 3—6 longiores subæquales; secunda sequente abrupte brevior, prima subspuria. *Cauda* mediocris, truncata. *Tarsi* digitique breves. *Acropodia* scutulata. *Ungues* parvi, fortius curvati, debiles.

The striking and distinctive characters of this genus are, the nares covered with velvet-like feathers, from the base of which strong vibrissæ are protruded, the short feet and the weakness of the claws. It is nearest allied to *Turdus* and *Oriolus*. From the former it differs in the greater arch of the beak and the lateral convexity of the sides of the culmen; from the latter in the curvature of the beak and the elevation of the culmen. It differs from both in the velvet-like covering of the nares, and in the lateral grooves of the upper mandible. The bill is also shorter and more convex than in *Meliphaga*, which has a semblance of a similar membrane over the nares, but is destitute of the downy covering.

Spec. 1. *Irena puella* mihi.

Côracias puella, *Lath. Ind. Orn.* 171.
Bressi Javanis.

Longitudo $8\frac{1}{2}$ poll.

The body above, the wings near the shoulders, the crown of the head, and the base of the tail, both above and beneath, are of a rich sky-blue, forming a strong and beautiful contrast with the other parts, which are of a deep velvet-black.

 Gen.

Gen. 17. Myiothera *Illiger*.

Spec. 1. *Myiothera affinis* mihi.

M. rufo-fusca, abdomine fulvescente creberrime violaceo fasciato, gula pallida, malis nigris, crisso uropygio rectricibusque externe azureis, tectricibus fascia alba.

Punglor Javanis.

Longitudo $7\frac{1}{2}$ poll. ♂.

Caput nigrum, vitta laterali crocea, ad basin rostri producta.

The malar spots in the male are produced into an elongate vitta on each side of the neck. The throat in both sexes is divided from the breast by a black band, which is terminated posteriorly with blue in the male and with dusky-grey in the female. The upper part of the head of the female is nearly of the colour of the back, and the lateral vittæ are testaceous chesnut. The white band on the wing-coverts is formed by a separate oblique band on each feather. The colour of the back and abdomen is more intense in the male than in the female.

Turdus cyanurus, *Latham Ind. Orn.* 361: (*Pl. Enl.* 355. Merle de Guiane differs in the band on the breast and in size.)

Gen. 18. Pastor *Temminck*.

Spec. 1. *Pastor griseus* mihi.

P. griseus nigrescens, remigibus rectricibusque nigris, his apice illis basi crissoque albis, rostro pedibusque flavis.

Jallak *sungu* Javanis.

Longitudo $7\frac{1}{2}$ poll.

Gracula cristatella, *Linn. Syst.* i. *p.* 165.
Merle hupé de la Chine, *Pl. Enl.* 507.

I have not preserved the specific name of *cristatella*, as it applies to most, perhaps to all the species of the genus *Pastor*.

Spec.

Spec. 2. *Pastor Jalla* mihi.

Sturnus capensis, *Linn. Syst.* i. *p.* 290.

L'Etourneau pie du Cap de B. Esp., *Pl. Enl.* 280.

Jallak seu *Jallak-uring* Javanis.

Corpus fusco-nigricans; *rectrices remiges*que saturatiores. *Rostrum pedes*que flavescentes. *Vertex*, *torques collaris gula*que atro-nitentes. *Malæ*, *pectus*, *abdomen*, *uropygium* fasciaque *alarum* albæ. *Tempora* nuda.

Spec. 3. *Pastor tricolor* mihi.

P. albus, remigibus rectricibusque nigris, his apice albis, dorso fascia nigricante grisea.

Jallak-*awu* Javanis.

Longitudo $8\frac{1}{2}$ poll.

Rostrum et *pedes* flavi.

Gen. 19. Motacilla *Latham*, *Temminck*.

Spec. 1. *Motacilla speciosa* mihi.

M. atra, pileo cristato ventre uropygio fascia alarum rectricibus extimis totis, ceteris apicibus niveis, cauda longissima forficata.

Chenginging seu *Kingking* Javanis.

Longitudo corporis $4\frac{1}{2}$; caudæ 6 poll.

The extremity of the quill-feathers has a slight cast of brown; the head, except the crest, the back, neck, breast, upper part of the abdomen, and the interior tail-feathers are most intensely black, exhibiting, when exposed to a strong light, a lustre of blue; at the extremity of three or four of the secondary wing-feathers is a very narrow band of white. The feathers of the *Hypochondriæ* are elongated and delicately villous. The bill is black, the feet are flesh-coloured.

 Spec.

Spec. 2. *Motacilla flava* Linn.*

Bessit Javanis.

Gen. 20. Sylvia *Latham.*

Spec. 1. *Sylvia Javanica* mihi.

S. olivaceo-viridis, capite plumbeo griseo, fronte gulaque tenuiter fulvescentibus, superciliis albidis, abdomine olivaceo-flavo.

Opior-opior Javanis.

Longitudo $4\frac{1}{2}$ poll.

Species S. Hippolai affinis. *Remiges* et rectrices externe olivaceo-viridi marginatæ. *Axillæ* albidæ. *Humeri* subtus flavescentes.

Spec. 2. *Sylvia montana* mihi.

S. olivaceo-fuscescens, alis caudaque pallide fuscis, subtus fuscescente testacea.

Chret Javanis.

Longitudo $4\frac{1}{2}$ poll.

* This bird belongs to *Budytes,* one of the subdivisions or sub-genera, formed by the celebrated Cuvier, of the genus *Motacilla* of Linnæus. In this instance I have, agreeably to the advice of this great naturalist, preserved the name of the genus (" *le substantif du grand genre,* Regne Animal, préface, p. 17), although in some cases, following the example of Temminck and others, I have employed the sub-genera of M. Cuvier as distinct genera.

A comparison of *Motacilla flava* with *Motacilla speciosa* exhibits some remarkable differences, which it may be proper to point out. As the former species is sufficiently known, I shall notice chiefly the characters of the latter. In this the bill is long, broad at the base, then suddenly compressed and attenuated or tapering almost equally to a point, which is abruptly curved. The bill is thus much more compressed laterally than in *Motacilla flava*; it has a rounded back, the terminal notch is more obvious, and the point is proportionally blunt. The groove containing the nares is more depressed, and the membrane covering the superior portion is larger and more prominent. In *Motacilla flava* the claw of the posterior toe is slender and greatly elongate, as in Larks; in *Motacilla speciosa* it is robust, short and curved as in Thrushes: the tarsi of the latter are also slender and elevated, and it has a forked tail.

Rostrum

Rostrum subdepressum validum obtusiusculum. *Pedes cauda*que elongati.

Gen. 21. SAXICOLA *Bechstein.*

Spec. 1. *Saxicola fruticola* mihi.

S. atra, scapulis uropygio crissoque albis.
Dechu Javanis.

Longitudo 5 poll.

Pectus et *abdomen* ferrugineo-griseo varia. *Remiges* externe tenuiter ferrugineo griseæ. *Rectrices* extimæ subbreviores.

Gen. 22. BRACHYPTERYX.

Rostrum mediocre, subcultratum, basi latius, ultra medium subconicum, attenuatum. *Culmen* inter nares carinatum, deinde rotundatum, apicem versus arcuatum, emarginatum. *Mandibula* lateribus marginatis, apice inclinata; *tomiis* maxillæ mandibulæque subinflexis. *Nares* maximæ, in fovea subrotunda basali elongata obtusa sitæ; supra et postice membrana clausæ. *Alæ* brevissimæ: *remiges* integræ, 1 subspuria, 2—5 gradatim increscentes, 5—10 subæquales longiores, reliquæ gradatim breviores. *Cauda* rotundata. *Pedes* elongati. *Digitus* medius longissimus. *Ungues* compressissimi, hallucis medio duplo majore, fortius arcuato.

The characters which distinguish this genus from *Motacilla* are the robustness of the bill, the arch or curvature of the culmen or back, the margin and inclination of the lower mandibule, and the size and protrusion of the nares. It possesses likewise peculiarities in the shortness of the wings and the elevation of the tarsi.

Spec. 1. *Brachypteryx montana.*

B. cærulescente-grisea, subtus pallidior, abdomine albido, remigibus

migibus rectricibusque fuscis, externe cærulescente-griseo marginatis.

Ketek Javanis.

Longitudo 6 poll.

Spec. 2. *Brachypteryx sepiaria.*

B. olivaceo subfulvescens, subtus dilutior, gula abdomineque medio albidis.

Chichohan Javanis.

Longitudo 5 poll.

Remiges et *rectrices* badio-fuscæ, externe fere badiæ: *rectrices* duæ mediæ concolores. *Crissum* badio-testaceum.

Gen. 23. Megalurus.

Rostrum mediocre, rectum, validiusculum, subcompressum, valde gradatim attenuatum. *Culmen* rotundatum, inter nares carinatum, apice emarginatum. *Nares* basales, superne membrana clausæ, apertura parva lineari juxta tomia. *Alæ* cauda breviores. *Remiges*: prima subspuria, secunda, tertia et quarta (quæ sunt æquales) paululum brevior, reliquæ gradatim breviores. *Cauda* valde elongata cuneata. *Pedes* validi; *tarsi* elongati. *Digiti* laterales æquales, medius longus. *Ungues* compressi acuti, hallucis medio dimidio major mediocriter arcuatus.

This genus appears to take a situation intermediate between *Motacilla* and *Anthus* on one side and *Alauda* on the other. It differs from the former in the strength and horny nature of the bill, in which it approaches to *Alauda*; but the bill is longer than in the latter genus, straight and decidedly notched. In the degree of enlargement and the curvature of the claw of the posterior toe it also holds an intermediate situation. The legs are comparatively robust, and the size of the tail is different from the allied genera.

Spec.

Spec. 1. *Megalurus palustris.*

M. fuscus, dorso griseo-testaceo vario, capite griseo et fuscescente vario, subtus albidus, pectore tenuiter fusco strigato.

Larri-angon Javanis.

Longitudo 9 poll.

Fam. VI. FRINGILLADÆ *Leach.*

CORNIROSTRES *Cuvier, Duméril.*

Gen. 24. MIRAFRA.

Rostrum breviusculum, crassum, conico-attenuatum, subcompressum. *Maxilla* arcuata culmine rotundato. *Nares* basales rotundæ, parte superiore membrana vestitæ. *Alæ* cauda breviores. *Remiges:* 1 spuria, 2—6 subæquales longiores, 3—6 externe emarginatæ, ceteræ gradatim breviores. *Pedes* mediocres: *digitus* medius elongatus. *Unguis* hallucis mediocriter arcuatus medio antico magis duplo longior.

The characters in which this genus differs from *Alauda* are a more robust, conical and arched bill, round nares nearly naked, and a proportionally short claw to the posterior toe. The sides of the beak, between the back (*culmen*) and cutting edges (*tomia*) are somewhat convex. In this character it has greater affinity to *Fringilla* than to *Alauda*, the bill of which is often subulate (as in *Sylvia*), while the nares are covered.

Mirafra, although it greatly resembles *Calandra*, differs from it in possessing the spurious remex, and in having the four instead of the three first remiges elongated.

Spec. 1. *Mirafra Javanica.*

M. supra fusca ferrugineo varia, subtus sordida, axillis pallide badiis.

Branjangan Javanis.

Longitudo $5\frac{1}{2}$ poll.

Gen.

Gen. 25. Parus *Linn.*

Spec. 1. *Parus atriceps* mihi.

P. cærulescente-griseus, subtus albidus, capite cæruleo-atro, malis albis.

Glate-wingko Javanis.

Longitudo $5\frac{1}{2}$ poll.

The tail consists of twelve feathers, the exterior of which are white, the next tipt with white, and the interior uniform in colour with he body of the bird.

Gen. 26. Fringilla *Illiger.*

Spec. 1. *Fringilla Philippina.*

Loxia Philippina, *Linn. Syst.* i. *p.* 305.
Gros-bec, des Philippines, *Pl. Enl.* 135. *f.* 2. ♂.
Manyar-*kembang* Javanis.

Spec. 2. *Fringilla Manyar* mihi.

F. supra fusca, plumis ferrugineo marginatis, subtus albido flavicans, gula pectoreque saturatiore, linea superciliari flavida.

Manyar Javanis.

Longitudo 5 poll.

Spec. 3. *Fringilla punicea* mihi.

F. saturate punicea, alis fuscis, cauda nigricante, tectricibus alarum pectore et abdomine albo punctatis.

Menyiring Javanis.

Longitudo $3\frac{1}{2}$ poll.

One of the smallest and most beautiful species of this genus. The coverts of the tail are more obscurely dotted; the interior tail-feathers are terminated by a narrow white band. The colours of the female are less brilliant.

Spec.

Spec. 4. *Fringilla punctularia.*

Loxia punctularia, *Linn. Syst.* i. *p.* 302.
Gros-bec tacheté de Java, *Pl. Enl.* 139. *f.* 1.
Pekking Javanis.

Very similar to Loxia molucca, *Linn. Pl. Enl.* 139. *fig.* 2, of which it seems to be merely a variety.

Spec. 5. *Fringilla striata.*

Loxia striata, *Linn. Syst.* i. *p.* 306.
Gros-bec de l'isle de Bourbon, *Pl. Enl.* 153. *fig.* 1.
Prit Javanis.

Spec. 6. *Fringilla prasina.*

F. viridi-olivacea, fronte regione orbitali gulaque azureis, remigibus rectricibusque nigricantibus, uropygio abdomineque coccineis, pectore ventre hypochondriisque ferrugineis.
Binglis Javanis (regionibus orientalibus Insulæ).

Longitudo $5\frac{1}{2}$ poll.

The two middle tail-feathers extend about half an inch beyond the others; the bill is intensely black and shining; the feet are reddish. In several of my specimens the bird appears in a different state of plumage; the upper parts of a greenish-olive, the lower of an uniform dusky-grey colour inclining to ferrugineous; the coverts of the tail are scarlet. From birds in this state the description of *Loxia prasina*, Mus. Carls. fasc. iii. 172. appears to have been made: "viridi-olivacea, subtus cano-flavicans, uropygio rubro." The bird above described, in a perfect state of plumage, greatly exceeds this in beauty.

Spec. 7. *Fringilla oryzivora.*

Loxia oryzivora, *Linn. Syst.* i. *p.* 302.
Gros-bec de la Chine, *Pl. Enl.* 152. *fig.* 1.
Glate Javanis.

Spec.

Spec. 8. *Fringilla Maja.*

Loxia Maja, *Linn. Syst.* i. *p.* 301. *Osbeck, It.* 2. *p.* 328.
Maja de la Chine, *Pl. Enl.* 109. *fig.* 1.
Bondol Javanis.

Gen. 27. SITTA *Linn.*

Spec. 1. *Sitta frontalis* mihi.

S. supra cæsia saturata, subtus testaceo-vinacea, fronte superciliisque atris, remigibus nigris.

Longitudo 5 poll.

Fam. VII. CORVIDÆ *Leach.*

Gen. 28. COLARIS *Cuvier.*

Spec. 1. *Colaris orientalis.*

Coracias orientalis, *Linn. Syst.* i. *p.* 159.
Rollier des Indes, *Pl. Enl.* 619.

This genus differs from *Roller* in the comparative stoutness, breadth and form of the beak, its sudden deflexion at the extremity, and the shortness of the tail. The nostrils are bounded with feathers posteriorly, which slightly project over them.

Gen. 29. EULABES *Cuvier.*

Spec. 1. *Eulabes religiosa.*

Gracula religiosa, *Linn. Syst.* i. *p.* 164.
Mainate des Indes Orientales, *Pl. Enl.* 268.
Beö seu *Mencho* Javanis.

Gen. 30. PHRENOTRIX.

Rostrum mediocre, validum, altum, cultratum, basi crassiusculum. *Maxilla* arcuata, lateribus subconvexis, lævibus, sensim in culmen conniventibus. *Capistrum* latum, plumulis holosericeis densis.

densis. *Nares* capistro reconditæ, circulares, parvæ, in medio sulci transversali ad basin rostri dispositæ. *Alæ* rotundatæ: remigibus integris 3 et 4 longioribus. *Cauda* corpore longior, cuneata, rectricibus 10 in paribus dispositis. *Pedes* congrui: *digiti* mediocres, exteriore medio ad basin levissime coalito. *Acropodia* scutulata. *Ungues* compressi: hallucis medio vix major.

This genus is strongly characterized by the form of the bill, which is elevated, regular and smooth, laterally tapering to a keel, equally arched from the base to the point. In the velvet-like border which surrounds the base of the beak it resembles the genus *Paradisea*. In its elevation, and in the smoothness and uniformity of the sides tapering to a regular keel, it differs from all the other genera of this family which I have examined.

Spec. 1. *Phrenotrix Temia.*

P. fuliginosa, nitore viridi-olivaceo fuscescente, scapulis alis caudaque supra saturatissimo viridi-olivaceo nitentibus, capistro atro.

Chekitut seu *Benteot* Javanis.

Temia, *Le Vaillant Afr.* 56.

Corvus varius, *Lath. Suppl.*

This bird is described by the celebrated Le Vaillant, *Ois. d'Afr. n.* 56; but as the native country was not known with certainty, and I have frequently observed it in Java, I have proposed *Phrenotrix* for the generic name, and applied *Temia* to the species.

Longitudo corporis 5 poll.; caudæ 7 poll.

Rectrices in paribus 5 dispositæ, ut caudam obverse cuneatam constituant; par primum minimum angustatum, paria sequentia sensim increscentia, par quintum maximum apicem versus utrinque dilatatum rotundatum.

 Gen.

Gen. 31. Fregilus *Cuvier.*

Spec. 1. *Fregilus Enca* mihi.

F. supra cyaneo-niger nitens, subtus obscurior, fronte malis antice gulaque atris.

Enca Javanis.

Longitudo 17 poll.

The lower and posterior parts of the space surrounding the eye are naked.

Fam. IX. Certhiadæ *Leach.*

Tenuirostres *Cuvier, Duméril.*

Gen. 32. Pomatorhinus.

Rostrum longiusculum, basi rectum, ultra nares modice incurvum et abruptius compressum, mesorhinio elevato: *culmine* validiusculo, carinato, apice integro. *Nares* operculo corneo oblongo convexo clausæ, *apertura* oblique postice spectans, juxta capistrum fornicata. *Alæ* rotundatæ. *Remiges:* 1 et 2 abrupte, 3 et 4 gradatim increscentes, 3—7 externe tenuiter emarginatæ. *Cauda* rotundata, elongata. *Pedes* subelongati. *Digitus* medius longior, cum exteriore basi leviter connexus. *Ungues* compressi, arcuati, posteriore majore, validiore. *Acropodia* scutulata; *acrotarsia* obscurior.

The corneous covering of the nares and its sudden compression and equal breadth beyond these form the distinguishing character of this genus, in which it differs both from the two following genera, and from that extensive group which comprises *Certhia*, *Nectarinia* and *Cinnyris*. The prominent, rounded and very gradually attenuated back or culmen is also peculiar to this genus.

Spec.

Spec. 1. *Pomatorhinus montanus.*

P. castaneus, capite cinerescente-nigro, striga postoculari gula pectoreque albis.

Bokkrek Javanis.

Longitudo $7\frac{1}{2}$ poll.

Gen. 33. Prinia.

Rostrum mediocre, rectum, basi latiusculum, ultra nares sensim attenuatum, apice validiusculo. *Maxilla* basi recta, apice levissime arcuata: *culmine* inter nares carinato, deinde rotundato, extremitate obsolete emarginato. *Mandibula* recta, ultra medium levissime sursum inclinata. *Nares* basales, magnæ, in fovea oblonga antice angustiore positæ, membrana tectæ, parte inferiore rima longitudinale apertæ. *Alæ* rotundatæ. *Remiges:* 1 abrupte, 2 et 3 gradatim breviores, reliquæ subæquales, 3—7 externe tenuiter emarginatæ. *Cauda* elongata cuneata. *Pedes* elongati. *Digitus* medius longiusculus cum exteriore basi coalitus. Hallux validiusculus medio antico major validior.

This genus is allied to the former, but it differs in the comparative straightness of the bill and its more gradual tapering to the point; it is also destitute of the horny covering of the nares. It holds an immediate place between *Pomatorhinus* and *Nectarinia.* In the situation of the nares it agrees with the latter, but the aperture is much larger and of a different form. The elevation of the tarsi constitutes a peculiar character.

Spec. 1. *Prinia familiaris.*

P. olivaceo-fusca, abdomine flavo, gula pectore fasciisque duabus alarum albis, cauda fascia subterminali perfusca apice alba.

Prinya Javanis.

Longitudo 5 poll.

Gen. 34. Orthotomus.

Rostrum mediocre, rectum, subdepressum, basi triquetrum, attenuatum:

nuatum: *culmine* basi carinato, versus apicem leviter arcuato. *Mandibula* tomiis rectissimis. *Nares* basales, magnæ, superne membrana clausæ, inferne rima longitudinali apertæ. *Alæ*: *remiges*, 1 spuria, 2 et 3 abrupte longiores, 4—8 longiores subæquales externe emarginatæ, ceteræ gradatim breviores cuneatæ. *Pedes* subelongati. *Digitus* exterior a medio ad basin connexus: *hallux* validus. *Ungues* compressi arcuati acuti, postico medio duplo majore. *Acropodia* scutulata.

The straightness and slenderness of the bill distinguish *Orthotomus* from the two former genera; these characters, with the depression and triangular form of the base of the bill, prevent its union with the other genera of this family. I have not been able to determine satisfactorily the affinity of this genus. The slenderness of the bill and its other habits associate it with the *Certhiadæ*; in the acumen of the bill and the size of the hallux it resembles in some degree the genus *Sitta*.

Spec. 1. *Orthotomus sepium.*

O. olivaceo-fuscescens, capite et tibiis ferrugineis, remigibus fuscis, gula pectoreque nigricantibus, abdomine flavido.

Chiglet Javanis.

Longitudo 4 poll.

Gen. 35. Cinnyris *Cuvier.*

Spec. 1. *Cinnyris affinis* mihi.

C. olivacea, subtus grisea sordido-fuscescente varia, rectricibus extimis apice albis.

Chess Javanis.

The general description of the *Certhia olivacea*, *Linn. Syst.* i. *p.* 185. 5, a native of Madagascar, applies to this bird; but our species exceeds the former three inches in length, and it wants the white orbits.

Spec.

Spec. 2. *Cinnyris longirostra* mihi.

Certhia longirostra, *Latham Ind. Orn.* 299.
Prit Andun Javanis.

The Javan species is larger and more brightly coloured.

Length $5\frac{1}{2}$ inches.

Gen. 36. Nectarinia *Illiger*.

Spec. 1. *Nectarinia Javanica* mihi.

N. multicolor, capite supra nucha dorsoque saturato-viridi-olivaceis, scapulis uropygioque violaceo nitentibus, alis genisque olivaceo fuscis, gula juguloque ferrugineis, pectore et abdomine croceis, cauda nigra.
Prit-Gantil Javanis.

Longitudo $4\frac{1}{2}$ poll.

A violet streak extends, below the cheeks, from the bill to the breast; the lower coverts of the wings are rufous, and the remiges have a yellowish margin. The tail is black with a greenish lustre above, fuliginous and paler underneath. The lustre of the upper parts of the male is very bright; the female is less diversified and almost without lustre. It is dark-olive green with a brownish tint above, and nearly uniformly yellow underneath. On the head and back a slight resemblance to the colours of the male is observable.

This bird has some affinity to the *Certhia lepida*, described in *Mus. Carls. fasc.* ii. *t.* 35.

Spec. 2. *Nectarinia pectoralis* mihi.

N. supra viridi-olivacea, fronte gula jugulo pectoreque cyaneo-nigris nitentibus, abdomine flavo, remigibus fuscis flavescente marginatis, rectricibus atris, fascia terminali alba.
Sri-Ganti Javanis.

Longitudo $3\frac{1}{2}$ poll.

The

The male is conspicuously distinguished by the blueish-black colour of the anterior parts, separating the breast from the abdomen by a defined line. The lower part of the tail appears nearly white: the interior rectrices are terminated by a narrow band, which on the exterior ones successively becomes wider.

The female differs from the male in entirely wanting the dark blackish-blue colour on the throat and breast.

Spec. 3. *Nectarinia eximia* mihi.

N. supra viridi-olivacea, capite supra caudaque saturissimo viridi-smaragdino nitentibus, gula pectoreque puniceis, fascia jugularis purpurea.

Plichi-kembang Javanis.

Longitudo $4\frac{1}{2}$ poll.

Rectrices duæ intermediæ longiores: *abdomen* fusco-olivaceum; *remiges cauda*que infra fuscæ; *uropygium* flavum; *abdominis* latera *axillæ*que lactea.

This is one of the most beautiful of the birds of Java. The colouring of the female is almost uniformly dark olive-green.

Fam. X. Meropidæ *Leach.*

Syndactyles *Cuvier.*

Tenuirostres *Duméril.*

Gen. 37. Dicæum *Cuvier.*

Spec. 1. *Dicæum cruentatum.*

Certhia cruentata, *Linn. Syst.* i. *p.* 187.

Black, white and red Indian Creeper, *Edw. t.* 81.

Vieillot Ois. ii. *t.* 36.

Sopa Javanis.

This bird is described by Linnæus and by Latham as a species of *Certhia*. M. Cuvier, agreeably to the method adopted in the *Règne Animal*, has also arranged it as a sub-genus of the *great*

genus

genus (*du grand genre*) of *Certhia* with the name DICÆUM*. This I have empolyed as a generic name.

The following description applying equally to *Dicæum cruentatum* and *flavum*, is given to show that the characters of this genus are sufficiently marked.

Rostrum capite brevius, basi latissimum, apicem versus abruptius acuminatum, subulatum. *Maxilla* leviter arcuata. *Culmen* inter nares carinatum. *Mandibula* recta. *Tomia* ambarum subintracta. *Nares* basales, magnæ, in sulco oblongo antice angustato positæ, supra membrana fornicali subcornea clausæ, rima longitudinali versus angulum oris apertæ. *Remiges:* prima duabus sequentibus quæ sunt æquales brevior, ceteræ gradatim decrescentes, 2—4 externe emarginatæ. *Cauda* truncata. *Pedes* congrui. *Digiti* anteriores compressi, exteriore cum medio usque ad extremitatem phalangis primæ coalito, halluce validiore. *Ungues* compressi, arcuati, postico medio fere duplo majore.

This genus forms a connecting link between *Nectarinia* and *Alcedo*, or between the families of *Certhiadæ* and *Meropidæ* or *Syndactyles.* In consequence of the subulate form of the extremity of the bill it has been placed in the genus *Certhia*; but it differs greatly as well from this genus as from *Cinnyris* and *Nectarinia*. The broad base and subulate point of the bill, the union of the exterior and middle toe for the length of one entire phalanx, and particularly its habits, distinguish it from the *Certhiadæ* and associate it with the *Meropidæ*.

* Having in a former part of this paper arranged one of the birds under the genus MELIPHAGA, it is necessary to state in this place, that I have not been able to reconcile to my investigations the following remarks of M. Temminck (*Manuel, préface,* 86.) on the identity of these two genera: "Tous les *Philedons* (*Meliphaga* Lewin) sont de l'océanique et des mers les plus reculées de l'Inde. Les espèces du genre *Dicée* de M. Cuvier y tiennent de si près, tant par leur forme générale que par les caractères pris du bec, des pieds, &c., qu'il est impossible de les distinguer des *Philedons* du même auteur."

 Spec.

Spec. 2. *Dicæum flavum* mihi.

D. olivaceo-flavum, subtus flavum, remigibus rectricibusque marginibus exterioribus exceptis perfuscis.

Longitudo 4 poll.

Gen. 38. Eurylaimus.

Rostrum capite brevius, validum, depressum, basi latissimum, postice dilatato-ampliatum, margine angusto intracto. *Rictus* amplissimus. *Maxilla* culmine obsolete carinato apice abrupte adunco, emarginato, tomiis verticalibus. *Mandibula* basi recta ad apicem maxilla congruenter curvata. *Nares* basales, subrotundæ, apertæ, omnino nudæ. *Pedes* congrui, gressorii. *Digiti* compressi, medius fere longitudine tarsi, hallux robustus. *Alæ* cauda breviores. *Rectrices* 12.

The distinguishing characters of this genus are a broad, depressed, cuneated beak (passing backwards into a narrow incurved margin, which extends beneath the eyes and forms an excessively wide throat) and prominent, erect, vertical cutting edges (*tomia*), associated with gressorial feet. In these characters, and also in the nakedness of the nostrils, it differs essentially from *Todus platyrhynchos*, which is arranged among the *Dentirostres* (*Sylviadæ* Leach) by M. Cuvier. It resembles *Todus viridis* (the only species of the genus known at present, *Temm.*) in the gressorial feet, but differs essentially from it in the form of the bill, disposition of the nares, &c.

Spec. 1. *Eurylaimus Javanicus* mihi.

E. capite toto corporeque infra vinaceis, dorso alisque perfuscis flavo variis, cauda atra fascia apicali alba.

Longitudo 11 poll.

Axillæ

Axillæ et crissum flavæ. *Dorsum* linea mediana, *alæ* linea irregulari flava variæ. *Remiges* intermediæ externe macula alba. *Uropygium* atrum flavo varium. *Rectrices* atræ, duæ intermediæ concolores, proxima utrinque fascia interiore alba, exteriores utrinque fascia alba.

Rostrum capite brevius, validum, lateribus ad apicem in cuneum attenuatis, basi latissimum, corneum; postice utrinsecus dilatato-ampliatum, margine intracto, angusto, sub oculos producto. *Vibrissæ* paucæ mastacales. *Rictus* amplissimus. *Maxilla* lateribus parum inclinatis basi latioribus, *culmine* obsolete carinato, rotundato, apice abrupte adunco, spatulato, emarginato, *tomiis* latis, porrectis, acutis, verticalibus, nigris. *Mandibula* depressa, *tomiis* verticalibus, basi rectis, versus apicem maxilla congruenter curvatis, obsolete emarginatis, acumine brevissimo obtuso terminali. *Nares* basales, laterales, subrotundæ, apertæ. *Pedes* mediocres, gressorii. *Tarsi* basi plumis tecti. *Digiti* compressi, medius longus (longitudinis fere tarsi), internus externo brevior, externus medio fere ad tertiam, internus ad secundam phalangem connexus, hallux medio antico paulo brevior, robustus. *Ungues* compressi, mediocres. *Alæ* cauda breviores. *Remiges*: prima brevior, secunda et quarta æquales, tertia longiuscula, quinta gradatim, sexta et ceteræ abrupte breviores. *Rectrices* 12.

Gen. 39. MEROPS *Linn.*

Spec. 1. *Merops Javanicus* mihi.

M. olivaceo-viridis splendore æneo, rectricibus duabus elongatis, linea frontali per oculos ad aures producta atra, crisso uropygioque thalassinis, gula sulphurea, jugulo castaneo, abdomine medio sordide thalassino, lateribus axillisque fulvis.

Kachangan Javanis.

Longitudo 11 poll.

Remiges primores et secundariæ fascia terminali nigra. Tænia thalassina obsoleta utrinque ad marginem *lineæ frontalis*. Latera *crissi* albentia.

Spec. 2. *Merops Urica* mihi.

M. olivaceo-viridis nitens, abdomine crisso uropygioque dilutioribus candore thalassino, pileo collo supra interscapulioque castaneis, gula juguloque sulphureis, linea temporali fasciaque pectorali semilunari atris, cauda subtus fuliginosa.

Pirik Javanis.

Longitudo 8 poll.

Cauda supra, splendore thalassino obscuriore. *Remigum* primorum et secundariarum apices nigræ.

Gen. 40. Alcedo *Linn.*

* Rostro gracile, culmine carinato.

Martin-pecheur *Le Vaillant.*

Spec. 1. *Alcedo Meninting* mihi.

A. supra nigricans, dorso medio thalassino, uropygio cyaneo, subtus badia, gula maculaque collari utrinque albidis.

Meninting Javanis.

Longitudo $5\frac{1}{4}$ poll.

Scapulæ maculis nonnullis cyaneis adspersæ. Striga inter oculos et rostrum utrinque sordide albida.

Spec. 2. *Alcedo Biru* mihi.

A. subazurea, remigibus interne fuscis, gula jugulo abdomine ventre alisque subtus albis.

Meninting-watu Javanis.

Longitudo $5\frac{1}{4}$ poll.

** Rostro

** Rostro læviore, culmine rotundato.

Martin-chasseur *Le Vaillant**.

* The birds of this section differ from those of the first, in having a dilated or swelled bill, of light consistence, large at the base, and gradually tapering towards the extremity, which is moderately compressed. The upper mandible is even, or slightly grooved from the nares to the point. The back (*culmen*) is rounded; not prominent or keeled, as in the species belonging to the first section (*sans arrete vive,* Temm.), and the extremity of the upper mandible forms a cavity for the reception of the lower.

The lower mandible is depressed at the base, swelled towards the middle, then gradually attenuated to a point, which is acute and somewhat smaller than the upper; so that when the bill is closed the sides are completely received within its margin. The cutting edges (*tomia*) of both mandibles are sharp; those of the upper are slightly curved or cut out towards the extremity; those of the lower are nearly straight. The upper mandible is slightly bent downwards near the point or tip, while the lower inclines upwards in a small degree.

The nostrils are basal, small, oblong, naked, having inferiorly a somewhat oblique aperture, while the upper portion is closed by a small membrane covered with plumes.

This section of the genus *Alcedo* (to the individuals of which the denomination of *Entomotheræ* "*Chasseurs*" may be applied) holds a situation intermediate between *Alcedo* and *Dacelo*. The preceding remarks show its difference from the first section. *Dacelo* has a thicker, stronger and more dilated beak, which does not exceed the head in length. The cutting-edges towards the extremity take a bold curve upwards, are deeply cut out, and the tip of the back (*culmen*) is lengthened beyond the curvature of the edges, abruptly truncated, and terminated by a small notch. The lower mandible is considerably swelled; the margin is not straight, as in the section of *Entomotheræ*, but curved upwards in conformity to the upper mandible. These characters are distinctly observed as well in the gigantic Kingsfisher from New Holland, as in a beautiful new species described in this paper under the name of *Dacelo pulchella*. It is remarkable that, although these two species differ greatly in size and in brilliancy of colours, the general distribution of the marks which form the specific character is the same. The forehead and crown are circumscribed by the lateral parts of the head and a posterior collar. The under parts in both are uniform; the wings above and the tail are transversely banded. In all the individuals of both the sections of the genus *Alcedo* that I have examined the colouring is more or less widely diffused in spots (*maculæ, plagæ,* &c.), or is exhibited in slight undulations, while *transverse* bands appear to be characteristic of the species of *Dacelo*.

Spec.

Spec. 3. *Alcedo tridactyla* Linn.

Ceyx *Lacep.*
Chuchack-urang Javanis.

Spec. 4. *Alcedo leucocephala* Gmel.

Tengke-*buto* Javanis.
Marten-pêcheur de Java. *Pl. Enl.* 757.

Spec. 5. *Alcedo coromanda* Lath.

Tengke-*sumbo* Javanis.
Martin-pêcheur violet de la côte de Coromandel. *Son. Voy. Ind.* ii. *p.* 212. *t.* 118.

Spec. 6. *Alcedo chlorocephala* Gmel.

Tengke-*cheger* Javanis.
Martin-pêcheur à tête verte, *Pl. Enl.* 783. *f.* 2.

Spec. 7. *Alcedo sacra* Gmel.

Tengke Javanis.
Variat Alced. sacra *Lath. Syn.* ii. *p.* 621. torque, pectore, abdomineque sordide ferrugineis, nigro tenuiter undulatis, uropygio thalassino. Affinis *var.* γ. *Ind. Orn.* 250.

Spec. 8. *Alcedo melanoptera* mihi.

A. dorso uropygio ventreque cyaneis, capite scapulisque nigris, remigibus thalassinis apice et subtus fuscis interne latissime albo fasciatis.
Tengke-*urang* Javanis.

Longitudo 10 poll.

Gula et annulus latus collaris fuliginoso-badiæ. *Cauda* thalassina subtus fuscescens.

Gen.

Gen. 41. Dacelo *Leach.*

Spec. 1. *Dacelo pulchella* mihi.

D. supra thalassino atro alboque fasciata, capite fusco badio, vertice azureo, gula juguloque albidis, abdomine ferrugineo diluto.

Tengke-watu Javanis.

Pulcherrima avis.

Longitudo 8 poll.

Fam. XI. Buceridæ *Leach.*

Gen. 42. Buceros *Linn.*

Spec. 1. *Buceros Rhinoceros* Linn.

Rangkok seu *Jongrang* Javanis. *Bont. Jav. t.* 64.

Spec. 2. *Buceros undulatus.* Shaw's Zool. viii. p. 26.

Goge sive *Bobosan* Javanis.

Le Calao à casque festonné. *Le Vaill. Cal. pl.* 20. 21.

Le Calao Javan male. *Le Vaill. Afr.* 239.

Spec. 3. *Buceros albirostris.* Shaw's Zool. viii. p. 13.

Klinglingan Javanis.

Le Calao à bec blanc. *Le Vaill. Cal. pl.* 14.

Ordo III. SCANSORES.

Fam. XII. Picidæ *Leach.*

Gen. 43. Picus *Linn.*

Spec. 1. *Picus Javensis* mihi.

P. niger, capite cristato cum tænia colli laterali coccineis, abdomine sordide testaceo.

Platuk-*ayam* Javanis.

Longitudo maris 15 poll.

The

The female exceeds the male about an inch in length; it is of a paler colour; the head is variegated above with blackish-grey and white. It has a scarlet mark on each side of the neck under the eyes; the colour of the belly is uniform with the rest of the body, and the throat and lower part of the neck are Isabella yellow.

Spec. 2. *Picus Bengalensis* Linn.

Platuk *bawang* Javanis.
Spotted Indian Woodpecker, *Edw. t.* 182.
Pie verd de Bengale, *Pl. Enl. t.* 695.

Longitudo 11 poll.

*Partes superiores alæ*que nigrescentes, *pileus* coccineus, subtus sordido-albo sagittatus: *fœminæ pileus* niger.

Picus Göensis and *Picus Bengalensis* of Gmelin and Latham appear to be the same bird: the Javan Woodpecker differs slightly from both, but there is considerable variety in our specimens.

Spec. 3. *Picus miniatus* Gmel.

Platuk Javanis.
The Red Woodpecker, *Pennant's Ind. Zool. p.* 39. *t.* 6.

Spec. 4. *Picus puniceus* mihi.

P. cristatus, pileo alisque puniceis, dorso et uropygio viridi-olivaceis, cauda nigra, subtus exsordido-saturato ferrugineo et olivaceo-albo variegatus.

Longitudo 8½ poll.

Maxilla inferior flava: *remiges* ultra medium subtusque fuscæ, pogonium internum albo fasciatum.

Spec. 5. *Picus strictus* mihi.

P. cristatus, rostro stricto gracili sensim attenuato, angulis superioribus parallelis æqualibus, lineolis transversis curvatis tenuissimis

tenuissimis notato, culmine stricto, mandibula inferiore flavescente.

Platuk Javanis.

Longitudo $10\frac{1}{2}$ poll.

Supra aurantio-viridis, subtus albo nigroque varius. *Cauda* nigra. *Pileus* maris coccineus, fœminæ aurantius.

Spec. 6. *Picus minor* Linn.

Platuk-*lallar* Javanis.

Picus minor, *var*. *γ*. *Lath. Ind. Orn. p.* 230.

La petite Epeiche, *Pl. Enl.* 598.

Spec. 7. *Picus tristis* mihi.

P. supra nigro alboque irregulariter fasciatus, subtus niger, uropygio albo.

Platuk-*watu* Javanis.

Longitudo 7 poll.

Rostrum conicum subarcuatum. *Pileus* et *cervix* tenuissime nigro alboque strigati. *Rectrices*, *remiges* et *plumæ* femorales nigro alboque fasciatæ.

** Pedibus tridactylis.

Spec. 8. *Picus tiga* mihi.

P. cristatus, supra aurantio-viridi-nitens, pileo, nucha, cervice uropygioque coccineis, subtus albo nigroque varius, cauda fuliginoso concolore.

Longitudo $8\frac{1}{2}$ poll.

Latera *capitis collum*que subtus alba, lineis quinque nigro alboque variis longitudinaliter notata; maculæ *pectoris* et *scapularum* saturate-atræ, *abdominis* dilutiores. *Remiges* fuliginosæ pogonio interno albo fasciatæ.

Feminæ pileus niger.

 Fam.

Fam. XIII. Cuculidæ *Leach.*

Gen. 44. Phœnicophaus *Vieillot.*

Spec. 1. *Phœnicophaus melanognathus* mihi.

Ph. supra viridi-æneo nitens, subtus caudaque margine lato spadiceis, maxilla flavicante mandibula pernigra.

Kadallan s. *Sintok* Javanis.

Longitudo corporis 7 : caudæ 11 poll.

The nostrils are elongate, and situated at the base of a groove which extends nearly to the middle of the beak.

Spec. 2. *Phœnicophaus Javanicus* mihi.

Ph. cano-viridescente niger, malis gula jugulo crisso cruribusque ferrugineo-badiis, rectricibus apice albis.

Bubut-kembang Javanis.

Longitudo $16\frac{1}{2}$ poll.

Gen. 45. Cuculus *Linn.*

Spec. 1. *Cuculus orientalis* Linn.

Tuhu ♂. *Chule* ♀. Javanis.

♂. Cuculus orientalis, *Linn.*

Coucou noir des Indes, *Pl. Enl.* 274. *fig.* 1.

♀. Cuculus Mindanensis, *Linn.*

Coucou varié de Mindanao, *Pl. Enl.* 277.

The cabinet of the Linnean Society contains a pair of these birds from New Holland, exhibiting the same sexual difference which occurs in the Javan specimens.

Spec. 2. *Cuculus fugax* mihi.

C. supra cinereo-griseus, cauda sordido-nigro fasciata, apice fusco-ferrugineo.

Longitudo $11\frac{1}{2}$ poll.

Corpus

Corpus subtus album, *pectus, venter hypochondria*que medio badia postice nigro lineata.

Spec. 3. *Cuculus flavus* Gmel.

Gedasse Javanis.
Coucou petit de l'isle de Panay, *Pl. Enl.* 814.
Sonnerat Voy. p. 122. *t.* 81.

Spec. 4. *Cuculus canorus* Linn.

I have not been able to ascertain the native name, as it is a very rare bird. In the specimens from Java a very slight difference from the bird as it occurs in Europe is observed.

Spec. 5. *Cuculus Pravata* mihi.

C. supra castaneus, infra albido et perfusco-undulatus, rectricibus nigris externe castaneis apice albis.
Tracha Javanis.

Longitudo 8½ poll.

Spec. 6. *Cuculus lugubris* mihi.

C. ater nitore viridi, remigibus exterioribus pogonio interno albo-notatis, rectricibus duabus externis crissoque albo fasciatis, tibiis postice albis.
Awon-awon Javanis.

Longitudo 10¼ poll.

Spec. 7. *Cuculus xanthorhynchus* mihi.

C. violaceus, axillis ventre rectricibusque externis albo fasciatis, rostro flavo.

Longitudo 6 poll.

Spec. 8. *Cuculus basalis* mihi.

C. fuscescens nitore viridi-aureo, gula jugulo pectoreque albido et

et pallido-fusco variis, abdomine albo et fuscescente fasciato, rectricibus intermediis basi castaneis.

Longitudo 6 poll.

Remiges: prima brevis, secunda et tertia longiores æquales, quarta præcedentibus duabus paulo brevior, quinta abrupte brevior, sequentes gradatim breviores *primores* fuscescentes. *Rectrices* externæ supra viridi-fuscescentes infra nigrescentes albido maculatæ, reliquæ (duabus intermediis exceptis) basi castaneæ, apice albo fasciatæ. *Crissum* albidum, maculis postice acuminatis fuscis nitentibus.

Gen. 46. Centropus *Illiger*.

Spec. 1. *Centropus affinis* mihi.

C. niger, alis ferruginosis, ungue hallucis arcuato.
Bubut-*allang-allang* Javanis.

Longitudo 14½ poll.

Plumæ scapulares fuliginosæ rachidibus albis. *Rectrices* externæ fasciola terminali albida.

Spec. 2. *Centropus Bubutus* mihi.

C. cyaneo-niger, nitens, alis badiis.
Bubut Javanis.

Longitudo 18½ poll.

Spec. 3. *Centropus lepidus* mihi.

C. supra fuliginosus, infra albus, rachidibus marginatis.

Longitudo 12 poll.

Plumæ pilei, colli, scapularum et *remiges* secundariæ fuliginosæ, longitudinaliter rachide alba marginata notatæ. *Tectrices* badiæ seu fuscæ, rachide alba. *Remiges* primores badiæ, apice fuscescentes. *Rectrices* nigræ, fascia terminali albida. *Gula, jugulum,*

jugulum, pectus et *abdomen* alba. *Uropygium, tectrices, cauda, pleura*que nigro et ferrugineo fasciata.

Fam. XIV. Bucconidæ *Leach.*

Gen. 47. Bucco *Linn.*

Spec. 1. *Bucco Javensis* mihi.

B. smaragdinus saturatus, pileo aurantio, fascia ad latera capitis atra duplici, una superciliari, altera jugulo utrinque conniventi, gula tæniaque transversa jugulari coccineis.

Chodok Javanis.

Longitudo 11 poll.

Size of *B. grandis.* A black band originates at the base of the bill below the nostrils, and includes the anterior angle of the eye; then divides, and proceeding backwards, one branch terminates on the occiput, while the other, diverging below the eyes, unites on the throat with that from the opposite side. At the rictus of the beak is an orange, and at the forehead, covering the stiff vibrissæ, is a scarlet spot. Some of the plumes of the head, neck and shoulders, and the upper side of the tail have a sea-green tint. The extremity of the remiges is brown. The breast and belly are of a paler green. The bill is very little curved at the extremity.

Spec. 2. *Bucco Philippensis* Linn.

Engku Javanis.

Barbu des Philippines, *Pl. Enl.* 331.

Spec. 3. *Bucco australis* mihi.

B. viridi-olivaceus, fronte gula cauda subtus scapulisque cyaneo-æruginosis, jugulo pectoreque croceo interposita fascia transversa nigra.

Truntung Javanis.

Longitudo $5\frac{1}{2}$ poll.

The

The cheeks have the same yellow colour as the breast; the tail above and the quill-feathers are blackish-brown; the latter have externally a dusky-yellowish border.

Fam. XV. Psittacidæ *Leach.*

Gen. 48. Psittacus *Linn.*

Spec. 1. *Psittacus Osbeckii* Lath.

Psittacus Javanicus. *Osb. It.*
Bettet Javanis.

Spec. 2. *Psittacus Galgulus* Linn.

Silindit s. *Silinditun* Javanis.

Longitudo $4\frac{1}{2}$ poll.

The wings beneath are blue, excepting an exterior margin of black, the outer larger half of the remiges being black, the interior blue; hence the extremity of the wings is also black. It differs from *Ps. vernalis* Mus. Carls. in size, and in the proportion of the wings to the tail.

Ordo IV. GALLINACEÆ.

Fam. XVI. Columbadæ *Leach.*

Gen. 49. Columba *Linn.*

Spec. 1. *Columba vernans* Linn.

Colombar Jojoo, *Temminck Hist. Nat. des Pigeons, pl.* 9 & 11.
♂. *Kate*, ♀. *Jowan* Javanis.

Spec. 2. *Columba litoralis* Temm.

Burung-dara lahut Javanis.
Colombe marine, *Temm. Pig. pl.* 7.
Columba alba, *Lath.*
Le Pigeon blanc mangeur de muscade, *Son. Voy. N. G. t.* 103.

Spec.

Spec. 3. *Columba melanocephala* Gmel.

Jowan-bondol Javanis.
Colombe Turgris, *Temm. Pig. pl.* 30.
The Black-capped Pigeon. *Pennant Ind. Zool. t.* 7.

Spec. 4. *Columba tigrina* Temm.

Dero s. *Derkuku* Javanis.
Colombe à nuque perlée, *Temm. Pig. pl.* 43.

Spec. 5. *Columba risoria* Linn.

Puter Javanis (cum pluribus varietatibus).
Colombe blonde, *Temm. Pig. pl.* 44.

Spec. 6. *Columba Bantamensis* Sparm.

Berkutut Javanis.
Columba bantamensis, *Mus. Carls. fasc.* iii. *t.* 67.

Spec. 7. *Columba bitorquata* Temm.

Puter-genni Javanis.
Colombe à double collier, *Temm. Pig. pl.* 40.

Spec. 8. *Columba Javanica* Temm.

Delimu s. *Glimukan* Javanis
Colombe Turvert, *Temm. Pig. pl.* 26.

Mr. Temminck unites under this name the *Columba Javanica*, the *C. cærulocephala*, and the *C. albicapilla* of Gmelin, the Javan and Blue-crowned Turtle, and Grey-headed Pigeon of Latham. My specimens and drawings contribute to show that this is done with propriety, and that they are merely varieties of one species.

Spec. 9. *Columba Amboinensis* Linn.

Derkuku-sopa Javanis.

The

The Javanese specimens differ in several particulars from the description of the Amboina Turtle. The upper part of the neck is covered with a purple gloss, and the black transverse bands are scarcely discernible.

Spec. 10. *Columba ænea* Linn.

A variety of this Pigeon, called *Geduwo* by the natives, is found in several parts of Java.

Fam. XVII. Tetraonidæ *Leach.*

Gen. 50. Perdix *Lath.*

Spec. 1. *Perdix Chinensis* Linn.

♂ Perdix chinensis, *Lath. Ind. Orn.* 652.
♀ Perdix manillensis, *Lath. Ind. Orn.* 655.
Caille des Philippines, *Pl. Enl.* 126. ♂.
Sonnerat Voy. N. Guin. t. 24. ♀.
Piker Javanis.

Spec. 2. *Perdix Javanica* Lath.

Dagu Javanis.
Brown's Ill. p. 40. *t.* 17.

Spec. 3. *Perdix orientalis* mihi.

P. cinereo-fuscescens, lunulis nigris castaneo marginatis, pileo regione orbitali torque collari atris, reliquis capitis collique partibus albis.

Longitudo 12 poll.

Rostrum nigrum, *pedes* carnei, *abdomen* cinereum nigro lunulatum.

Gen. 51. Ortygis *Illiger.*

Hemipodius *Temminck.*

Spec.

Spec. 1. *Ortygis luzoniensis.*

♂ *Drigul* Javanis. (A word derived from the Sanskrit, the literal meaning of which is *three-toed.*)

♀ *Gomma* Javanis.

Perdix luzoniensis, *Lath. Ind. Orn.* 656.

Caille de l'isle de Luçon, *Son. Voy. p.* 54. *t.* 23.

Fam. XVIII. Phasianidæ *Leach.*

Gen. 52. Gallus *Brisson.*

Spec. 1. *Gallus Javanicus* mihi.

G. caruncula compressa integra, subtus niger, plumis pilei colli pectorisque postice nigro aureo et cyaneo variis, tectricibus linearibus utrinque pendulis.

Pitte-wonno Javanis.

Phasianus varius, *Shaw's Zool. Misc.* 353.

Caruncula supra rubra nigro marginata, subtus parte anteriore rubra, posteriore flava.

Spec. 2. *Gallus Bankiva* Temm.

Bengkiwo seu *Bekikko* Javanis.

Fam. XIX. Pavonidæ *Leach.*

Gen. 53. Pavo *Linn.*

Spec. 1. *Pavo Javanicus.*

P. crista elongata, plumis linearibus simplicibus.

Merak Javanis.

Differt præsertim *Pav. cristata* Linnæi, crista plumis linearibus composita, plumulis colli, pectoris dorsique viridi-æneo nitentibus, fascia terminali nigro-violaceo variegatis, plumis scapularibus tectricibusque alarum minoribus smaragdino et splendente-cyaneo variis.

 Ordo

Ordo V. GRALLÆ.

Fam. XX. Charadriadæ *Leach.*

Gen. 54. Vanellus *Brisson.*

Spec. 1. *Vanellus melanogaster* Bechst.

Chibugan Javanis.
Tringa Squatarola, *Linn. Syst.* i. *p.* 252.
Vanneau gris, *Pl. Enl.* 854.

The abdomen and vent are purely white; the forehead, breast, and lateral parts of the neck are whitish and variegated with paler spots of the same colour as the upper parts, which are brown variegated with dusky-white. The colouring of the Javan bird is less striking and vivid than in the European specimens described by M. Temminck (*Man.* 547, &c.).

The following species belongs to a natural section of this genus, in which the wings are armed with spines, and the base of the bill is provided with fleshy pendulous caruncles.

Spec. 2. *Vanellus tricolor* mihi.

V. griseo-fuscus, capite remigibus rectricibus abdomineque atris, pleuris alis subtus crisso caudaque basi apiceque albis.
Terek Javanis.

Longitudo $12\frac{1}{2}$ poll.

Rostrum utrinque caruncula membranacea pendula instructum. *Pedes* longissimi. *Tibiæ* ad medium plumosæ. *Digiti* elongati, medio cum exteriore basi membrana connexo. *Alæ* cauda longiores. *Humeri* spina forti armati.

Differt *Charadrio bilobo* Gmel. *Pl. Enl.* 880. statura majore, alisque spinosis.

Gen.

Gen. 55. CHARADRIUS *Linn.*

Spec. 1. *Charadrius Cantianus* Lath.

Trendasan Javanis.
Charadrius albifrons, *Meyer.*
Charadrius litoralis, *Bechstein.*

Spec. 2. *Charadrius pluvialis* Linn.

Trule Javanis.
Golden Plover, *Br. Zool.* ii. *n.* 208.

Spec. 3. *Charadrius Asiaticus* Gmel.

Charadrius asiaticus, *Pallas Reise* ii. p. 715.

Spec. 4. *Charadrius pusillus* mihi.

C. cinereo-fuscus subtus albus, pectore fascia transversa partibus superioribus concolore, rectricibus intermediis cinereo-fuscis apicem versus fascia saturatiore.

Gen. 56. CURSORIUS *Lath.*

Spec. 1. *Cursorius Isabellinus* Meyer.

Cursorius Europæus, *Lath. Ind. Orn.* 751.
Charadrius gallicus, *Gmel. Syst.* i. *p.* 692.

In the Javan specimens the colouring is less vivid than in the European specimens that I have seen.

Gen. 57. GLAREOLA *Brisson.*

Spec. 1. *Glareola orientalis* Leach.

Tre Javanis.

This bird is described and figured in the present volume of the Society's Transactions by Dr. Leach, from a specimen in Paris, brought from Java by M. Leschenault.

Fam. 21. ARDEADÆ *Leach.*

CULTRIROSTRES, *Duméril, Cuvier.*

Gen. 58. CICONIA *Brisson.*

Spec. 1. *Ciconia Javanica* mihi.

C. corpore nigro nitore olivaceo saturatissimo, subtus albido, vertice calvo, collo nudiusculo villis pilisque nonnullis sparso.

Bangu Javanis.

Erecta 5 pedes longa. Rostrum 11-pollicare.

The Javan bird differs in various particulars from the *Ardea Argala* of Latham, to which it is allied.

A broad band with a brownish lustre passes the wing transversely.

Spec. 2. *Ciconia leucocephala.*

Sandang-lawe Javanis.

Ardea leucocephala, *Gmel. Syst.* i. *p.* 642.

Heron de la côte de Coromandel, *Pl. Enl.* 906.

Corpus supra *alæ*que violaceo-chalybeo-nigra. *Pileus* ater. *Crissum, cauda, collum*que alba. *Pectus* et *abdomen* vinaceo-nitentia. *Frons malæ*que nudiusculæ. *Plumæ* colli lanuginosæ.

Gen. 59. ARDEA *Linn.*

Spec. 1. *Ardea cinerea* Lath.

Changa-awu Javanis.

Spec. 2. *Ardea purpurea* Linn.

Changa-ulu Javanis.

Spec. 3. *Ardea Egretta* Linn.

KUNTUL Javanis.

In

In a young specimen the beak, excepting the base of the lower mandible, is black. See Temminck's *Manuel, p.* 572, &c. on this species, and its plumage at different ages.

Spec. 4. *Ardea affinis* mihi.

A. alba, capite crista collo antice plumisque dorsalibus elongatis fulvo-castaneis, crista setosa, plumis dorsalibus filiformibus.

Kuntul-*chilik* Javanis.

Rostrum flavum, *pedes* nigrescentes.

Spec. 5. *Ardea Malaccensis* Gmel.

Blekko Javanis.

Crabier de Malac, *Pl. Enl.* 911.

*Corpus alæ*que alba. *Dorsum* cinereo-fuscum. *Pileus collum*que supra fusco sordido-albo castaneoque striati. *Pectus* castaneum. *Mandibula* basin versus flava, *maxilla* apice *pedes*que plumbeæ.

Spec. 6. *Ardea speciosa* mihi.

A. cristata alba, dorso nigro, collo supra flavescente subtus fulvo.

Blekko-*ireng* Javanis.

Longitudo 18 poll.

The crest is formed of four linear, elongate, pendulous plumes, two of which are longer than the others. The plumes surrounding the neck are filiform, very long and pendulous. The beak is whitish at the base and black at the point. The legs are flesh coloured.

Spec. 7. *Ardea nycticorax* Linn.

Guwo Javanis.

Spec. 8. *Ardea sinensis* Gmel.

Bambangan Javanis.

Spec. 9. *Ardea flavicollis* Lath.

Tomtomman sive *Tototan* Javanis.

Crista

*Crista occipitis corpus*que fuliginosæ. *Rectrices* et *remiges* nitore saturatissime cyaneo. Species an distincta *A. flavicolli* Lath.?

In the cabinet of the Linnean Society is a specimen from New Holland greatly resembling the Javan species.

Spec. 10. *Ardea lepida* mihi.

A. Isabellina-fuscescens dorso saturatiore, subtus dilutior, pileo crista remigibus rectricibusque atris, collo postice malisque rufo-castaneis.

Longitudo 15 poll.

Plumæ pectus tegentes fuscæ, saturatæ, flavescente marginatæ.

Spec. 11. *Ardea nebulosa* mihi.

A. supra spadiceo-ferrugineo et sordido-flavo nebulosa, tæniis transversis, subtus dilute castanea collo pallidiore, longitudinaliter strigis fuscis notata, pileo nigrescente, cauda remigibusque badiis.

Longitudo 14 poll.

Strigæ *colli* breviores, *pectoris* et *abdominis* longiores.

Spec. 12. *Ardea Javanica* mihi.

A. cristata cæsia, pileo alis caudaque saturate olivaceis æneo splendentibus, remigibus apice nigris, plumis dorsalibus linearibus longissimis æneo et canescente variegatis.

Upi-upian Javanis.

Longitudo 11 poll.

The base of the lower mandible is white. A black spot extends from the beak to the anterior margin of the eye. The throat is purely white, and the anterior part of the neck and breast have a cast of dusky-white. The coverts of the wings are attenuated to a point, which has a narrow white border. The legs are reddish-brown.

Spec.

Spec. 13. *Ardea cinnamomea* Gmel.

Ayam-ayaman Javanis.

Fam. XXII. TRINGIDÆ *Leach.*

Gen. 60. NUMENIUS *Brisson.*

Spec. 1. *Numenius Phæopus* Lath.

Gajahan Javanis.
Numenius minor, *Brisson.*
Whimbrel, *Lath.*

Gen. 61. SCOLOPAX *Illiger.*

Spec. 1. *Scolopax saturata* mihi.

S. rostro subelongato apice tuberculato, supra ex nigro saturatissimo castaneoque variegata subtus pallidior.

Tekken Javanis.

Longitudo 12 poll.

This is one of the rarest of Javan birds, found once only near a mountain-lake at an elevation of 7000 feet above the ocean.

At the base of the lower mandible is a small whitish spot: the anterior part of the neck is transversely banded with black and chesnut; the breast and abdomen are sooty-black with irregular dusky bands.

Spec. 2. *Scolopax Gallinago* Linn.

Burchet Javanis.

Gen. 62. TOTANUS *Bechstein.*

Spec. 1. *Totanus affinis* mihi.

T. supra perfuscus plumis pallidiore marginatis, remigibus primoribus perfuscis, secundariis intensiore albenteque fasciatis, subtus caudaque albis, hac fusco fasciata.

TRINIL Javanis.

Longitudo 10 poll.

This

This bird is nearly allied to *T. Glareola*; it differs principally in the marks of the secondary quill-feathers, and in the lower continuation of the covering of the tibiæ.

Spec. 2. *Totanus hypoleucos* Temm.

TRINIL *batu* Javanis.

Tringa hypoleucos, *Linn. Syst.* i. *p.* 250.

Guinetta, *Brisson.*

Spec. 3. *Totanus acuminatus* mihi.

T. supra fuscus, plumis dorsalibus ferrugineo tectricibus griseo marginatis, subtus albidus, pectore sublutescente, rectricibus acuminatis.

TRINIL *gung* Javanis.

In this, as in several other instances, the Javanese have a common term applying to several birds, as TRINIL; while those which they have observed to be nearest allied to them are distinguished by a particular epithet, as TRINIL *batu*, TRINIL *gung*, &c.

Spec. 4. *Totanus tenuirostris* mihi.

T. supra pallide fuscus cinereo varius, remigibus fuscis, subtus albens, gula pectoreque fuscescente maculatis, rostro tenui.

Keeyo Javanis.

The beak is more slender than in the European species of this genus.

Spec. 5. *Totanus Damacensis* mihi.

T. supra pallide cinereo-fuscus, subtus albus, remigibus fuscis rachidibus primorum albis aliarum fuscescentibus.

Longitudo $6\frac{1}{2}$ poll.

Spec. 6. *Totanus Glottis* Bechstein.

Benonchang Javanis.

Limosa grisea, *Brisson.*

Spec.

Spec. 7. *Totanus Javanicus* mihi.

T. rostro basi albente, supra griseo-fuscus scapulis remigibusque saturatioribus, subtus albus, tectricibus inferioribus ultra medium albis oblique truncatis, pedibus subabbreviatis, cauda supra omnino concolore.

Bedaran seu *Choweyan* Javanis.

Longitudo 10 poll.

Gen. 63. RYNCHÆA *Cuvier.*

Spec. 1. *Rynchæa orientalis* mihi.

R. supra cinereo-fusca, capite lineis tribus dorso duabus luteo-badiis, pectore cinereo-fusco, abdomine albo fascia semilunari diviso, cauda supra remigumque apicibus griseis.

Pengung Javanis.

Scolopax Maderaspatana, *Gmel. Syst.* i. *p.* 667.

Partridge-Snipe, *Raii Syn. p.* 193. *t.* 1. *fig.* 2.

Becassine de Madagascar, *Pl. Enl.* 922.

Gen. 64. LIMOSA *Brisson.*

Spec. 1. *Limosa melanura* Leisler.

Scolopax Limosa, *Linn. Syst.* i. *p.* 245.

Biru-lahut Javanis.

The entire neck intensely cinereous. Half the size of the large European specimen. I have followed M. Temminck in the reference to the specific denomination, see *Manuel* &c., *p.* 664.

Gen. 65. TRINGA *Linn.*

Spec. 1. *Tringa subarquata* Temm.

Scolopax subarquata, *Gmel. Syst.* i. *p.* 658.

Mayatan Javanis.

Gen. 66. HIMANTOPUS *Brisson.*

Spec. 1. *Himantopus melanopterus* Meyer.

Gagang-bayem Javanis.

Charadrius Himantopus, *Linn. Syst.* i. *p.* 255.

Echasse, *Pl. Enl.* 878.

The reference to Meyer is made agreeably to M. Temminck's *Manuel, p.* 529. The Javanese specimens differ from those of Europe that I have seen, in having the tint of cinereous on the tail much paler.

In a second specimen, which has the appearance of a young bird in change, the upper part of the head is blackish, and the hinder part of the neck dusky.

Fam. XXIII. RALLIDÆ *Leach.*

Gen. 67. PARRA *Linn.*

Spec. 1. *Parra superciliosa* mihi.

P. atro-viridis nitens, lineis superciliaribus albis, dorso alisque olivaceo-nitentibus, remigibus nigris, uropygio caudaque ferrugineis nitore violaceo.

Pichisan Javanis.

Longitudo 17 poll.

Caruncula superne rotundata. *Calcaria alarum* obtusa.

Gen. 68. PORPHYRIO *Brisson.*

Spec. 1. *Porphyrio Indicus* mihi.

P. niger, splendore saturate olivaceo, capite ventreque fuliginosis, jugulo pectore humerisque thalassinis, lateribus colli abdomineque purpureis, crisso albo, clypeo frontali latissimo post oculos producto, culmine recte conjuncto, digito medio unguiculato tarsi longitudinis.

Pellung Javanis.

Longitudo 19 poll.

Clypeus

*Clypeus frontalis pedes*que rufi. *Calcaria alarum* brevia acutissima recondita.

Gen. 69. GALLINULA *Brisson.*

Sect. 1. Clypeo frontali non dilatato.

Spec. 1. *Gallinula gularis* mihi.

G. fusca, subtus pallide gilva fusco transversim undulata, tectricibus et plumis dorsalibus sordido gilvo marginatis, rectricibus canescente-fuscis, gula alba.

Bureng Javanis.

Longitudo 17 poll.

Spec. 2. *Gallinula lugubris* mihi.

G. plumbeo-nigrescens, tectricibus et plumis dorsalibus marginibus pallidioribus, remigibus fuscescentibus, margine alarum anteriore albo.

Bontod Javanis.

Longitudo 20 poll.

Dorsum plumbeo nigricans, nitore fuscescente. *Plumæ* crissi albo transverse fasciatæ. *Fasciolæ* tenuissimæ fuscescentes abdominis. *Axillæ* pallidiores albo fasciatæ. *Remiges* secundariæ pallidiore fusco marginatæ.

Sect. 2. Clypeo frontali dilatato.

Spec. 3. *Gallinula orientalis* mihi.

G. clypeo frontali ovato oculos fere attingente.

Pro s. *Opel-opellan* Javanis.

Longitudo 13 poll.

This species differs from the *Gallinula Chloropus* in being considerably smaller, and in having a much wider and differently shaped frontal clypeus.

 Spec.

Spec. 4. *Gallinula Javanica* mihi.

G. supra nigra, subtus alba, uropygio flavescente ferrugineo.
Sri-bombo Javanis.

Longitudo 14 ad 15 poll.

This species appears to hold an intermediate situation between the first and second sections which are established by M. Temminck: the frontal clypeus is short, circumscribed, marginated, and slightly carinated in the middle. It greatly resembles the Red-tailed Water-Hen, *Gallinula Phœnicurus*, Ind. Zool. t. 9; *Rallus Phœnicurus*, Gmel. Pl. Enl. 896: but it is more than a third larger; it has a black tail, and the clypeus has a different form.

The forehead and the sides of the head are white, the axillæ and the lateral parts of the abdomen are black.

Gen. 70. Rallus *Linn.*

Spec. 1. *Rallus gularis* mihi.

R. nigro-fuscus, albo undulatus, fronte vertice occipite et cervice supra ferrugineis, gula alba, jugulo pectoreque intense plumbeis, abdomine albo fasciato.
Tikussan Javanis.

Longitudo 12 poll.

Spec. 2. *Rallus fuscus* Linn.

Le Rale brun des Philippines, *Pl. Enl.* 773.

The brown of the upper parts inclines to rufous, and the ferrugineous of the breast and forehead to chesnut. The bill is short and somewhat compressed.

Spec. 3. *Rallus quadristrigatus* mihi.

R. supra fuscus gilvo mixtus, subtus pallidior gula albida, capite supra nigricante, utrinque strigis duabus albis.

Longitudo $8\frac{1}{2}$ poll.

Gen.

Gen. 71. Fulica *Linn.*

Spec. 1. *Fulica atra* Linn.

Common Coot, *Br. Zool.* ii. *n.* 220. *t.* 77.

This bird does not appear to differ in any degree from the European species.

Ordo VI. PALMIPEDES.

Fam. XXIV. Pelecaniadæ *Leach.*

Pinnipedes, *Duméril.*
Totipalmes, *Cuvier.*

Gen. 72. Pelecanus *Linn.*

Spec. 1. *Pelecanus Philippensis* Gmel.

Walang-kadda Javanis.

*Vertex nucha*que cristati. *Dorsum* glaucum. *Alæ* fuscæ. *Rachides pennarum* nigræ.

Spec. 2. *Pelecanus Javanicus.*

P. albus, crista obsoleta, remigibus primoribus nigris, secundariis et plumis dorsalibus nigro marginatis, rachidibus pennarum albis, rostro latiore.

Bakkul Javanis.

Longitudo 4 ped.

Gen. 73. Carbo *Meyer.*

Spec. 1. *Carbo Javanicus* mihi.

C. corpore nigro, capite lævi.

Pechuck Javanis.

Longitudo corporis caudæque 16 poll.

Rostrum

Rostrum nigricans, *mandibula* inferior pallida. *Corpus alæ*que nigra, candore cinereo-argenteo, plumis marginibus atris. *Gula* alba. *Collum* subtus nigro, fusco, fuliginosoque varium. *Crura* concolora atra. *Abdomen* fasciolis tenuissimis cinereis notatum.

Statura et coloribus differt *Carbone Cormorano* Meyeri.

Gen. 74. Plotus *Linn.*

Spec. 1. *Plotus melanogaster* Gmel.

Black-bellied Anhinga, *Ind. Zool. p.* 13. *t.* 12.

Fam. XXV. Colymbidæ, *Leach.*

Gen. 75. Podiceps *Latham.*

Spec. 1. *Podiceps minor* Latham.

Colymbus minor, var. β. *Gmel. Syst.* i. *p.* 591.
Le Castagneux des Philippines, *Pl. Enl.* 945.
Titihan Javanis.

Fam. XXVI. Laridæ *Leach.*

Gen. 76. Sterna *Linn.*

Spec. 1. *Sterna minuta* Linn.

Toyang Javanis.

A young bird: remiges less intensely coloured; frontal white spot less defined.

Spec. 2. *Sterna Javanica* mihi.

S. glauca, gula malis cervice postice alis caudaque infra albis, capite supra nigro, remigibus griseo fuscescentibus interne plaga albida notatis, rostro pedibusque flavis.

Longitudo 11 poll.

Spec.

Spec. 3. *Sterna media* mihi.

S. fronte cervice postice et partibus inferioribus albis pileo albo nigroque vario, nucha atra, alis dorso uropygioque glaucis, remigibus supra fuscis cano pulverulentis, subtus dimidio exteriore intense glaucis interiore albis.

TOYANG-*kacher* Javanis.

Longitudo 15 poll.

The feet are black, the bill is greatly lengthened, and the interior border of the sixth, seventh and eighth remiges, which is white, is very regularly defined.

Spec. 4. *Sterna grisea* mihi.

S. supra grisea, corpore subtus annulo collari fronteque albis, remige exteriore nigricante, rostro nigro.

Puter-lahut Javanis.

Longitudo 9 poll.

Spec. 5. *Sterna affinis* mihi.

S. alba, dorso tectricibusque plumbeo-griseis, remigibus canis interne subfuscescentibus.

Allied to *Sterna Anglica*, Montagu.

Fam. XXVII. ANATIDÆ *Leach.*

Gen. 77. ANAS *Linn.*

Spec. 1. *Anas Javanica* mihi.

A. alis supra medium caudaque juxta uropygium castaneis, dorso cum partibus inferioribus alarum nigro fuscescentibus, collo sordido fulvo canescente, gula pallidiore, abdomine castaneo-vinaceo.

Melivis Javanis.

Longitudo 17 poll.

Pileus

Pileus et *cauda* apice nigrescentes: *crissum* et *hypochondria* albentia: *plumæ dorsales* fulvo marginatæ.

Var. β. A. plumis interscapulii, pectoris, ventrisque fasciis nigris variegatis, pileo nigro, plumis hypochondriarum albis utrinque nigro fasciatis, crisso albo.

Melivis-kembang Javanis.

Præcedente 2 pollices fere longior.

XV. *An*

XV. *An Account of a new Genus of Plants, named* RAFFLESIA. *By Robert Brown, Esq., F.R.S. Libr. L.S.*

Read June 30, 1820.

It is now nearly eighteen months since some account of a Flower of extraordinary size was received by my lamented friend and patron the late revered President of the Royal Society, from Sir Stamford Raffles, Governor of the East India Company's establishments in Sumatra.

This gigantic Flower, which forms the subject of the present communication, was discovered in 1818 on Sir Stamford's first journey from Bencoolen into the interior. In that journey he was accompanied by a naturalist of great zeal and acquirements, the late Dr. Joseph Arnold, a member of this Society, from whose researches, aided by the friendship and influence of the Governor, in an island so favourably situated and so imperfectly explored as Sumatra, the greatest expectations had been formed. But these expectations were never to be realized; for the same letter which gave the account of the gigantic Flower, brought also the intelligence of Dr. Arnold's death.

As in this letter many important particulars are stated respecting the plant which I am about to describe, and a just tribute is paid to the merits of the naturalist by whom it was discovered, I shall introduce my account by the following extract.

"Bencoolen, 13th August, 1818.

"You will lament to hear that we have lost Dr. Arnold: he fell a sacrifice to his exertions on my first tour into the interior, and died of fever about a fortnight ago.

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"It is impossible I can do justice to his memory by any feeble encomiums I may pass on his character; he was in every thing what he should have been, devoted to science and the acquisition of knowledge, and aiming only at usefulness.

"I had hoped, instead of the melancholy event I have now to communicate, that we should have been able to send you an account of our many interesting discoveries from the hand of Dr. Arnold. At the period of his death he had not done much; all was arrangement for extensive acquirement in every branch of natural history. I shall go on with the collections as well as I can, and hereafter communicate with you respecting them, and in the mean time content myself with giving you the best account I can of the largest and most magnificent Flower which, as far as we know, has yet been described. Fortunately I have found part of a letter from poor Arnold to some unknown friend, written while he was on board ship, and a short time before his death, from which the following is an extract.

"After giving an account of our journey to Passummah, he thus proceeds:

"'But here (at Pulo Lebbar on the Manna River, two days journey inland of Manna) I rejoice to tell you I happened to meet with what I consider as the greatest prodigy of the vegetable world. I had ventured some way from the party, when one of the Malay servants came running to me with wonder in his eyes, and said, "Come with me, Sir, come! a flower, very large, beautiful, wonderful!" I immediately went with the man about a hundred yards in the jungle, and he pointed to a flower growing close to the ground under the bushes, which was truly astonishing. My first impulse was to cut it up and carry it to the hut. I therefore seized the Malay's parang (a sort of instrument like a woodman's chopping-hook), and finding that it sprang from a small root which ran horizontally (about as large as two fingers,

or

or a little more), I soon detached it and removed it to our hut. To tell you the truth, had I been alone, and had there been no witnesses, I should I think have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower I have ever seen or heard of; but I had Sir Stamford and Lady Raffles with me, and a Mr. Palsgrave, a respectable man resident at Manna, who, though equally astonished with myself, yet are able to testify as to the truth.

" 'The whole flower was of a very thick substance, the petals and nectary being in but few places less than a quarter of an inch thick, and in some places three-quarters of an inch; the substance of it was very succulent. When I first saw it a swarm of flies were hovering over the mouth of the nectary, and apparently laying their eggs in the substance of it. It had precisely the smell of tainted beef. The calyx consisted of several roundish, dark-brown, concave leaves, which seemed to be indefinite in number, and were unequal in size. There were five petals attached to the nectary, which were thick, and covered with protuberances of a yellowish-white, varying in size, the interstices being of a brick-red colour. The nectarium was cyathiform, becoming narrower towards the top. The centre of the nectarium gave rise to a large pistil, which I can hardly describe, at the top of which were about twenty processes, somewhat curved and sharp at the end, resembling a cow's horns; there were as many smaller very short processes. A little more than half-way down, a brown cord about the size of common whip-cord, but quite smooth, surrounded what perhaps is the germen, and a little below it was another cord somewhat moniliform.

" 'Now for the dimensions, which are the most astonishing part of the flower. It measured a full yard across; the petals, which were subrotund, being twelve inches from the base to the apex, and it being about a foot from the insertion of the one petal to

to the opposite one; Sir Stamford, Lady Raffles and myself taking immediate measures to be accurate in this respect, by pinning four large sheets of paper together, and cutting them to the precise size of the flower. The nectarium in the opinion of all of us would hold twelve pints, and the weight of this prodigy we calculated to be fifteen pounds.

" 'I have said nothing about the stamina; in fact, I am not certain of the part I ought to call stamina. If the moniliform cord surrounding the base of the pistil were sessile anthers, it must be a polyandrous plant; but I am uncertain what the large germen contained; perhaps there might be concealed anthers within it.

" 'It was not examined on the spot, as it was intended to preserve it in spirits and examine it at more leisure; but from the neglect of the persons to whom it was intrusted, the petals were destroyed by insects, the only part that retained its form being the pistil, which was put in spirits along with two large buds of the same flower, which I found attached to the same root: each of these is about as large as two fists.

" 'There were no leaves or branches to this plant; so that it is probable that the stems bearing leaves issue forth at a different period of the year. The soil where this plant grew was very rich, and covered with the excrement of elephants.

" 'A guide from the interior of the country said, that such flowers were rare, but that he had seen several, and that the natives called them *Krûbût*.

" 'I have now nearly finished a coloured drawing of it on as large drawing-paper as I could procure, but it is still considerably under the natural size; and I propose also to make another drawing of the pistil removed from the nectarium.

" 'I have now, I believe, given you as detailed an account of this prodigious plant as the subject admits of; indeed it is all I

know

know of it. I would draw your attention, however, to the very great porosity of the root, to which the buds are attached.

" 'I have seen nothing resembling this plant in any of my books; but yesterday, in looking over Dr. Horsfield's immense collections of the plants of Java, I find something which perhaps may approach to it; at any rate the buds of the flower he has represented grow from the root precisely in the same manner: his drawing, however, has a branch of leaves, and I do not observe any satisfactory dissections. He considers it as a new genus; but the difference of the two plants appears from this, that his full-blown flower is about three inches across, whereas mine is three feet.'

Sir Stamford proceeds:

" Dr. Arnold did not live to return to Bencoolen, nor to fulfil the intentions expressed in the above extract; but we have finished the drawing of the whole flower, and it is now forwarded under charge of Dr. Horsfield, to whom I have also intrusted the pistil and buds.

" I shall make exertions for procuring another specimen, with which I hope we shall be more fortunate."

(Signed) "T. S. RAFFLES."

To the Right Honourable
Sir JOSEPH BANKS, Bart. G.C.B., &c. &c.

The drawing of the expanded flower, and the specimens mentioned in the preceding extract, were brought to England by Dr. Horsfield; and, having been put into my hands, I proceeded without delay to examine the smaller flower-bud. In this examination the antheræ, although not at first obvious, were soon discovered, but no part was found which could be considered either as a perfect pistillum, or as indicating the probable nature or even the exact place of the ovarium. The remains of the expanded

panded flower exhibited the same structure; and the larger bud, which was examined by Mr. Bauer, whose beautiful drawings of it form the most valuable part of the present communication, proved also to be male.

These materials, it must be admitted, are insufficient even for the satisfactory establishment of the proposed new genus, and in my opinion do not enable us absolutely to determine its place in the natural system.

The curiosity of botanists, however, has been so much excited by the discovery of a flower of such extraordinary dimensions, the male flower is in many respects so singular, and its structure is so admirably illustrated by Mr. Bauer's drawings, that, accompanied by them, even the present incomplete account will probably be thought worthy of a place in the Society's Transactions.

Its publication is the less objectionable, as it may still be a considerable time before the plant is met with in all its states; and however unsatisfactory our present materials may be, either for determining its affinities, or the equally important question, whether it be parasitic on the root to which it is attached, there can be no doubt that it forms a genus abundantly distinct from any that has hitherto been described.

It is proposed, in honour of Sir Stamford Raffles, to call this genus Rafflesia, the name I am persuaded that Dr. Arnold himself would have chosen had he lived to publish an account of it; and it may in the mean time be distinguished by the following characters.

RAFFLESIA.

RAFFLESIA.

Perianthium monophyllum, coloratum; *tubo* ventricoso; *corona faucis* annulari, indivisa; *limbo* quinquepartito, æquali.

MAS. *Columna* (inclusa): *limbo apicis* reclinato, subtus simplici serie polyandro; *disco* processibus (concentricis) tecto.

Antheræ sessiles, subglobosæ, cellulosæ, poro apicis dehiscentes.

FEM.------

RAFFLESIA ARNOLDI.

TABB. XV.—XXII.

DESCRIPTIO.

E *Radice* lignea horizontali tereti, lævi, crassitie fere et structura interiore omnino radicis Vitis viniferæ (*tab.* 22. *f.* 8.) ortum ducit *Flos* unicus, ante expansionem, dum bracteis imbricatis adhuc inclusus, brassicæ minori figura et magnitudine similis (*tab.* 16.); cum radice parum dilatata connexus *Basi* (*tab.* 17.) modicè convexa, abbreviata, insignita lineolis numerosis, elevatis, nigricantibus, plerisque reticulatim confluentibus, nonnullis brevioribus distinctis, omnibus sulco longitudinali tenui per axin exaratis, apothecia Opegraphæ æmulantibus, superioribus desinentibus in *annulum* modicè elevatum exsulcum, ejusdem fere substantiæ, definientem basin reticulatam.

Bracteæ (*tab.* 16.) supra annulum baseos reticulatæ, numerosæ, densè imbricatæ, subrotundæ, coriaceæ, glaberrimæ, integerrimæ, venis vix vel parum emersis, ramosis, distinctis, nec anastomosantibus, infra apicem evanescentibus, lata basi insertæ ibique crassæ, versus apicem sensim tenuiores, subfoliaceæ; intimæ e latiore basi, $\frac{1}{5}$ usque ad $\frac{1}{4}$ circuli æquante.

Perianthium (*tab.* 15.) intra bracteas sessile, monophyllum, coloratum, ante expansionem depresso-sphæroideum (*tab.* 18 et 19.).

Tubus

Tubus ventricosus, abbreviato-urceolatus, extus lævis, intus ramentis filiformibus simplicibus passimque parum divisis densè tectus. *Faux: corona* annulari integerrima, intus ornata areolis numerosis, convexiusculis, subrotundis transversim paulo latioribus, superioribus omnino lævibus, reliquis margine inferiore aucto ramentis filiformibus brevibus. *Limbus* quinquepartitus (diametro tripedali), *laciniis* æqualibus, (patentibus reflexisve) rotundatis, integerrimis, *extus* lævibus, præter venas parum elevatas, numerosas, dichotomas, passim anastomosantes, ad apicem usque attingentes; *intus* verrucis numerosis, subrotundis, sparsis, inæqualibus, interstitiis lævibus: *æstivatione* arctè imbricatis, exterioribus interiores utroque margine equitantibus (*tab.* 19.).

Columna centralis (*tab.* 20. et 21. *fig.* 1.) staminifera, cavitatem tubi perianthii ferè omnino replens, inclusa, solida, carnosa, intùs cum substantia ipsius baseos reticulatæ extus cum tubi superficie ramentacea continua; prope basin aucta *annulis* duobus modicè elevatis, rotundatis, ante expansionem approximatis (*tab.* 21. *f.* 1, 2.), in expanso flore remotioribus (*tab.* 22. *f.* 2.), *inferiore* paulo crassiore, striis leviter depressis numerosis rugoso, *superiore* exsulco, punctis minutis elevatis inæquali: supra annulum superiorem lævis et sensim angustata in *collum* brevissimum, insculptum *excavationibus* (*tab.* 21. *f.* 2.) numero antherarum iisque oppositis, basi angustatis, longitudinaliter elevato-striatis, interstitiis subcarinatis, carinis marginibusque ciliatis: *apex* dilatatus, cujus *discus* planiusculus, tectus *processibus* numerosis carnosis leviter incurvis subcorniformibus, simplicibus apiceve parum divisis, in seriebus pluribus concentricis, interioribus plus minus irregulariter dispositis, nonnullis minoribus sæpe minimis sparsim intermixtis, majorum singulis fasciculo vasculari centrali tenui instructis, omnibus lævibus, præter apices lobulorum qui sæpe hispiduli

hispiduli vel minutè penicillati; *limbus* solutus reclinatus, e basi recurvata, subtus punctis parvis elevatis quandoque piliferis inæquali, adscendens, margine erecto-conniventi, indiviso tenuiter crenulato, substantia et superficie processibus disci similis, intus fasciculis vascularibus simplici serie dispositis et ad basin antheræ singulæ flexura notabili instructis (*tab.* 21. *f.* 2, 3, 7, 8. et *t.* 22. *f.* 6.).

Antheræ (*tab.* 21. *f.* 4—8. et *t.* 22. *f.* 4—6.) simplici serie dispositæ, æquidistantes, 35 circiter, vix 40, sessiles, excavationibus dimidiæ recurvatæ limbi, cum iis colli continuis, lata basi insertæ, semiimmersæ, apicibus deorsum spectantibus, in respondentibus cavitatibus colli receptis, ovato-globosæ, pisi magnitudine, apice depressione unica centrali demum aperiente umbilicatæ, cellulosæ, cellulis indefinitè numerosis, subconcentricis, longitudinalibus, exterioribus versus apicem conniventibus, passim confluentibus et quandoque transversim interruptis, plenis *Polline* (*tab.* 21. *f.* 9.) minuto, sphærico, simplici, lævi.

Pistilli rudimenta nulla certa; processus enim corniculati apicis columnæ staminiferæ, in circulis pluribus concentricis dispositi atque singuli fasciculo vasculari centrali donati, dubiæ naturæ sunt.

To the foregoing description of *Rafflesia* it is necessary to add some observations explanatory of structure; and I shall also offer a few conjectures on certain points of the economy of the plant, and on its affinities.

The great apparent simplicity in the internal structure of every part, especially in a flower of such enormous size, is in the first place deserving of notice.

This observation particularly applies to the *Column*, which is found to consist of a uniform cellular texture, with a very small

 proportion

proportion of vessels. The *cells* or utriculi are nearly sphærical, slightly angular from mutual pressure, and, in the specimens examined at least, easily separable from each other without laceration. I have not been able to detect perforations on any part of their surface; but extremely minute granules, originally contained in great abundance in the cells, and frequently found adhering to their parietes, may readily be mistaken for pores.

The structure of *vessels* either in the column, perianthium or bracteæ, in all of which they are apparently similar, has not been satisfactorily ascertained. They may be supposed to approach most nearly to the ligneous, though certainly unaccompanied by spiral vessels, which do not appear to exist in any part of the plant.

The same internal structure is continued below the origin of the bracteæ, down to the line at which the vessels of the root appear to terminate, and where an evident change takes place (*plate* 20. and 22. *f.* 1.).

The *Perianthium* and *Bracteæ* in their cellular texture very nearly agree with the column, except that in their more foliaceous parts the cells are considerably elongated.

I have not found in any part of their surface, or in that of the column, those areolæ universally considered as cuticular pores, and which, though of very general occurrence, do not perhaps exist in the imperfectly developed leaves of plants parasitic on roots.

In the external composition of the column, the part most deserving of attention is the *Anthera*; for in apparent origin, as well as in form and structure, it presents the most singular modification of stamen that has yet been observed.

It appears to me of importance to inquire into the real relation which so remarkable a structure bears to the more ordinary states of Anthera.

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A satisfactory determination of this point, while it would certainly assist in explaining the nature of the other parts of the column, might also in some degree lead to correct notions of the affinities of the genus; and the question is perhaps sufficiently interesting, even independent of these results.

In this inquiry, it is necessary in the first place to take a general view of the principal forms of Antheræ in phænogamous plants; all of which, however different they may appear, I consider as modifications of one common structure.

In this assumed regular structure or type of Anthera, I suppose it to consist of two parallel folliculi or *thecæ*, fixed by their whole length to the margins of a compressed filament: each *theca* being originally filled with a pulpy substance, on the surface or in the cells of which the pollen is produced; and having its cavity divided longitudinally into two equal cells, the subdivision being indicated externally by a depression or furrow, which is also the line of dehiscence*. The

* A certain degree of resemblance between this supposed regular state of Anthera, and that which in a former essay (on Compositæ, *Linn. Soc. Transact.* xii. *p.* 89.) I have considered as the type of Pistillum in phænogamous plants, will probably be admitted; and both structures have, as it appears to me, an evident relation to the *Leaf*, from whose modifications all the parts of the flower seem to be formed.

This hypothesis of the formation of the Flower may be considered as having originated with Linnæus in his *Prolepsis Plantarum*, though he has not very clearly stated it, and has also connected it with other speculations, which have since been generally abandoned. It is, however, more distinctly proposed by Professor Link (in *Philos. Bot. Prodr. p.* 141), and very recently has been again brought forward, with some modifications, by M. Aubert du Petit Thouars.

In adopting the hypothesis as stated by Professor Link, I shall, without entering at present into its explanation or defence, offer two observations in illustration of it, founded on considerations that have not been before adverted to.

My first observation is, that the principal point in which the antheræ and ovaria agree, consists in their essential parts, namely, the pollen and ovula, being produced on the margins of the modified leaf.

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The structure now described actually exists in many families of plants; and the principal deviations from it may be stated to depend either on a reduced or increased development of the parts enumerated, on differences in the manner of bursting, or on the confluence of two or more antheræ.

Reduced development may consist merely in the approximation of the thecæ, consequent on the narrowing or entire absence of the connecting portion of the filament, which is one of the most common states of anthera; in their partial confluence, generally at the upper extremity; their parallelism either continuing,

In the *Antheræ,* which are seldom compound, and whose thecæ are usually distinct, the marginal production of pollen is generally obvious.

In the *Ovaria,* however, where, with very few exceptions, the same arrangement of ovula really exists, it is never apparent, but is always more or less concealed either by the approximation and union of the opposite margins of the simple pistillum, and of the compound when multilocular; or in the unilocular pistillum with several parietal placentæ by the union of the corresponding margins of its component parts.

The few cases of apparent exception, where the ovula are inserted over the whole or greater part of the internal surface of the ovarium, occur either in the compound pistillum, as in *Nymphæa* and *Nuphar;* or in the simple pistillum, as in *Butomeæ* of Richard; and in *Lardizabaleæ,* an order of plants sufficiently distinct in this remarkable character alone, and differing also in the structure of embryo and in habit, from *Menispermeæ,* to which the genera composing it (*Lardizabala* and *Stauntonia*) have hitherto been referred.

The marginal production of ovula, though always concealed in the ordinary or complete state of the Ovarium, not unfrequently becomes apparent where its formation is in some degree imperfect, and is most evident in those deviations from regular structure, where stamina are changed, more or less completely, into pistilla. Thus, in the case of the nearly distinct or simple pistillum, it is shown by this kind of monstrosity in *Sempervivum tectorum*; in the compound multilocular pistillum, by that of *Tropæolum majus;* and in the compound pistillum with parietal placentæ, by similar changes in *Cheiranthus Cheiri, Cochlearia armoracia, Papaver nudicaule* and *Salix oleifolia.*

In all the cases now quoted, and in several others with which I am acquainted, it is ascertained that a single stamen is converted into a simple pistillum, or into one of the constituent parts of the compound organ: a fact which in my opinion establishes the proposed type of Ovarium.

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tinuing, which is also not unfrequent; or accompanied by various degrees of divergence, as in many genera of *Labiatæ*; in their complete confluence while they remain parallel, as in *Epacrideæ*, *Polygaleæ*, and in some genera of *Acanthaceæ*; and lastly, in the imperfect production or entire suppression of one of the thecæ, as in *Westringia*, *Anisomeles* and *Maranteæ*.

Increased development may in like manner be confined to the dilatation, elongation, or division of the connecting portion of the filament, of which examples occur in many *Scitamineæ*, *Orchideæ* and *Acanthaceæ*; it may consist in the elongation of

I have entered thus slightly at present into the proof of this type, derived from these deviations from regular structure, partly on account of an observation which I find in the second edition of the excellent *Théorie Elémentaire de la Botanique* of Professor De Candolle, to whom, in 1816, I had shown drawings of most of the instances of monstrosity now mentioned. To these drawings, and to my deductions from them with regard to the structure of pistillum, I suppose the ingenious author alludes in the passage in question. His views, however, on this subject differ considerably from mine, which he does not seem to have been aware were already published (*Linn. Soc. Trans. l. c.*).

My second observation relates to the more important differences between the antheræ and ovaria, independent of their essential parts.

In the Anthera the vascularity, with relation to that of the Leaf, may be said to be diminished without being otherwise sensibly modified; the pollen is formed in a cellular substance apparently destitute of vessels; and is always produced internally, or under the proper membrane of the secreting organ.

In the Ovarium, on the other hand, the vascularity, compared with that of the Leaf, is in general rather modified than diminished; the principal vessels occupying the margins or lines of production, and giving off branches towards the axis, whose vascularity is frequently reduced. The ovula constantly arise from vascular cords, and, with reference to the supposed original state of the ovarium, are uniformly produced externally; though by the union of its parts, whether in the simple or compound state, they become always inclosed, and, before fecundation at least, are completely protected from the direct action of light and of the atmosphere.

In *Coniferæ* and *Cycadeæ*, however, according to the view I am disposed to take of them (*Tuckey's Congo, append. p.* 454.), this is not entirely the case. But these two families will perhaps be found to differ from all other phænogamous plants in the more simple structure both of their ovaria and antheræ.

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the thecæ either above or below the connecting filament; in an increased number of divisions of each theca by longitudinal, transverse, or oblique processes of the receptacle of the pollen, as in several genera of *Orchideæ* and *Laurinæ*; or in the persistence of part of the cells in which the pollen is formed, as in *Ægiceras.*

Reduced and increased development of different parts may co-exist in the same organ, as in the bifid or incumbent anthera with contiguous thecæ; in the extraordinary dilatation of the connecting portion of the filament, while one of the thecæ is abortive or imperfect, as in the greater number of *Salviæ*; or in the thecæ being confluent, while the polliniferous cells are at the same time persistent, as in certain species of *Viscum.*

The deviations from the regular mode of bursting are also numerous; in some cases consisting either in the aperture being confined to a definite portion, generally the upper extremity, of the longitudinal furrow, as in *Dillenia* and *Solanum*; in the apex of each theca being produced beyond the receptacle of the pollen into a tube opening at top, as in several *Ericinæ*; or in the two thecæ being confluent at the apex, and bursting by a common foramen or tube, as in *Tetratheca.* In other cases a separation of determinate portions of the membrane takes place, either the whole length of the theca, as in *Hamamelideæ* and *Berberideæ*; or corresponding with its subdivisions, as in several *Laurinæ*; or lastly, having no obvious relation to internal structure, as in certain species of *Rhizophora.*

The regular structure may also be altered or disguised by the union of two or more stamina; the thecæ of each anthera either remaining distinct and parallel, as in *Myristica*, *Canella*, and in several *Aroideæ*; being divaricate and united, as in *Cissampelos*; or absolutely separate, by division of the filament, as in *Conospermum* and *Synaphea.*

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It is unnecessary for my present purpose to enter into a more minute account of the various structures of stamina, most of which appear to me easily reducible to the type here assumed.

The precise relation of the anthera of *Rafflesia*, however, to this type is so far from being obvious, that at least three different opinions may be formed respecting it.

According to one of these, each actual anthera would be considered as composed of several united stamina. But in adopting this opinion, which is suggested solely by the existence and disposition of the cells of the anthera, it seems also necessary to consider the apparently simple flower of *Rafflesia* as in reality compound, and analogous to the spike of an *Aroidea*; the pistilla, if present, being consequently to be looked for not in the centre but in the circumference. On attending, however, to the whole external structure of the flower, as well as to the disposition of vessels, this supposition will, I conclude, appear still more improbable than that in support of which it is adduced.

A second opinion, diametrically opposite to the former, would regard the anthera of *Rafflesia*, as only half a regular anthera, whose two thecæ are separated by portions of the united filaments, which, being produced beyond the antheræ, together form the crenated limb of the column.

This view, though less paradoxical than the first, will hardly be considered as affording so probable an explanation of structure as the third opinion; according to which each anthera would be regarded as complete, made up of two united thecæ, opening by a common foramen, and internally subdivided into numerous vertical cells by persistent portions of the confluent receptacles of the pollen; a structure not perhaps essentially different from that of certain antheræ more obviously reducible to the supposed type.

Even in adopting this opinion, a question would still remain respecting

respecting the limb of the column under which the antheræ are inserted; namely, whether it is to be viewed as an imperfectly developed stigma, or as made up of processes of the united filaments. In support of the former supposition the nearly similar relation of the sexual organs in certain *Asarinæ* may be adduced; and in favour of the latter, not only their disposition and form in other plants of the same natural family, but also the vascular structure of the column itself; the limb deriving its vessels from branches of the same fasciculi that supply the antheræ (*plate* 20. *f.* 1.). If this latter view, however, of the origin of the limb were admitted, it might be considered not altogether improbable, that even the corniculate processes of the disk of the column, each of which has a central vascular cord, are of the same nature. For if, on the other hand, these processes are to be regarded as imperfect styles or stigmata, their number and disposition would indicate a structure of ovarium to be found only in families to which it is not probable at least that *Rafflesia* can be nearly related, as *Annonaceæ* and the singular genus *Eupomatia**, which I have placed near that natural order.

Another point to be inquired into connected with the same subject is, in what manner the impregnation of the female flower is likely to be effected by antheræ so completely concealed as those of *Rafflesia* seem to be in all states of the flower; for it does not appear either that they can ever become exposed by a change in the direction of the limb under which they are inserted, or even that this part of the column in any stage projects beyond the tube of the perianthium.

It is probable, therefore, that the assistance of insects is absolutely necessary; and it is not unlikely, both as connected with that mode of impregnation and from the structure of the anthera itself, that in *Rafflesia* the same economy obtains as in the sta-

* Flinders's *Voyage*, ii. *p.* 597. *tab.* 2.

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mina of certain *Aroideæ*, in which it has been observed that a continued secretion and discharge of pollen takes place from the same cell; the whole quantity produced greatly exceeding the size of the secreting organ.

The passage of the pollen to the bottom of the flower, where it is more easily accessible to insects, seems likewise to be provided for, not only by the direction of the antheræ, but also by the form of the corresponding cavities in the neck of the column, in the upper part of which they are immersed.

That insects are really necessary to the impregnation of *Rafflesia*, is confirmed by Dr. Arnold's statement respecting the odour of the plant, by which they may be supposed to be attracted, and also by the fact of the swarms actually seen hovering about and settling in the expanded flower.

The structure of *Rafflesia* is at present too imperfectly known to enable us to determine its place in the natural system. I shall, however, offer some observations on this question, which can hardly be dismissed without examination.

As to which of the two primary divisions of phænogamous plants the genus belongs, it may, I think, without hesitation be referred to *Dicotyledones*; yet if the plant is parasitic, and consequently no argument on this subject to be derived from the structure of the root, which is exactly that of the Vine*, its exclusion from *Monocotyledones* would rest on no other grounds, that I am able to state, than the quinary division of the perianthium, which in other respects also bears a considerable resemblance to that of certain dicotyledonous orders; the number of stamina, and the ramification of vessels in the bracteæ.

Assuming, however, that *Rafflesia* belongs to *Dicotyledones*, and

* Compare the magnified section of the Root, *tab.* 22. *f.* 8. with that of the Vine in Grew's Anat. *tab.* 17.

and considering the foliaceous scales which cover the unexpanded flower, both from their indefinite number and imbricate insertion as bracteæ, and consequently the floral envelope as simple, its comparison with the families of this primary division would be limited to such as are apetalous; either absolutely as *Asarinæ*; those of a nature intermediate between the apetalous and polypetalous, in which the segments of the perianthium are generally, though not always, disposed in a double series, as *Passifloreæ*, *Cucurbitaceæ* and *Homalinæ*; or those which have a simple coloured floral envelope, but are decidedly related to polypetalous families, as *Sterculiaceæ*.

With *Asarinæ*, the only truly apetalous order to which it seems necessary to compare it, *Rafflesia* has several points of resemblance, especially in the structure of the central column. In *Aristolochia* the antheræ, though only six in number, are in like manner sessile, and inserted near the apex of a column formed by the union of stamina and pistillum. The mere difference in the number of stamina seems to be of no importance in the present question, there being twelve in *Asarum*; and in *Thottea*, a genus certainly belonging to this family, though referred by Rottböll to *Contortæ**, the stamina are not only still more numerous, but are disposed in a double circular series one above the other; an arrangement which may perhaps be considered analogous to the concentric series of processes in the apex of the column of *Rafflesia*.

In all these genera of *Asarinæ* and in *Bragantia* of Loureiro, which is also referable to the same order, the flowers are hermaphrodite; but in *Cytinus*, which, if not absolutely belonging to this order, is at least very nearly related to it, they are diclinous.

The affinity is also in some degree confirmed by the appearance of the inner surface of the tube of the perianthium of some

* Thottea grandiflora. *Rottböll in Nov. Act. Soc. Reg. Hafn.* ii. *p.* 529. *tab.* 2.

Asarinæ,

Asarinæ, especially *Aristolochia grandiflora*, and by the thickening or annular projection of the faux in the same plant, as well as in a new species of *Bragantia* discovered in Java by Dr. Horsfield.

It may also be noticed in support of it, that some of the largest flowers which were known before the discovery of *Rafflesia* belong to *Asarinæ*, as those of *Aristolochia grandiflora*, and particularly *Aristolochia cordiflora* of Mutis, which, according to M. Bonpland, are sixteen inches in diameter, or nearly half that of our plant*.

The first objection that occurs to this approximation is the ternary division of the perianthium in the regular flowered genera of *Asarinæ*, opposed to its quinary division in *Rafflesia:* but in *Cytinus* it is divided into four segments, a number more generally connected in natural families with five than with three.

A second objection would exist, if it be considered more probable that the ovarium of *Rafflesia* is superior, or free, than inferior, or cohering with the tube of the perianthium.

There is indeed nothing in the structure of the column itself indicating the particular position of the ovarium. But if it be admitted, that a base of a form equally calculated for support should exist in the female flower, as is found in the male, it might perhaps be considered somewhat more probable that such a base should be connected with a superior than with an inferior ovarium.

Even admitting this objection, however, it would be considerably weakened, on the one hand, by allowing that *Nepenthes*, which has a superior ovarium, is related to *Asarinæ*, as I am inclined to believe; and on the other, by considering *Homalinæ*, whose ovarium is inferior, as allied to *Passifloreæ*, the order with which I shall now proceed to compare *Rafflesia*.

This comparison is suggested by the obvious resemblance between the perianthium of our genus, and that of certain species

* *Humboldt Bonpl. et Kunth Nov. Gen. et Sp.* ii. *p.* 118.

 of

of *Passiflora* itself; or of other genera of the order, as *Deidamia*, in which the inner series of segments is wanting. Thus, they agree essentially, and even remarkably, in æstivation of perianthium: the corona of *Rafflesia* may be compared with that of *Murucuia*, and the two annular elevations at the base of the column with the processes of like origin and nearly similar form in some species of *Passiflora*. The affinity is also supported by the position of the stamina on a central column.

The peculiar structure of antheræ in *Rafflesia* can hardly be regarded as an objection of much weight to the proposed association; and it will at least almost equally apply to any other family with which this genus may be compared.

If the concentric processes on the disk of the column in our plant are to be regarded as indications of the number and disposition of pistilla, or of the internal structure of ovarium in the female flower, they present a formidable objection to its affinity with *Passifloreæ*, in all of which the ovarium is unilocular with parietal placentæ. If, however, these processes were considered as inner series of imperfect stamina, the objection derived from their number and arrangement merely, would be comparatively slight; for in some genera of *Passifloreæ*, particularly in *Smeathmannia**, the stamina are also numerous and perhaps even indefinite. It

* As *Smeathmannia* forms a very remarkable addition to the order in which I have proposed to place it, and is still unpublished; I shall here give its characters, and add a few remarks in support of this arrangement.

SMEATHMANNIA. *Soland. Mss. in Biblioth. Banks.*
Ord. Nat. Passifloreæ. *Br. in Tuckey's Congo, p.* 439.
Syst. Linn. Polyandria Pentagynia.

CHAR. GEN. *Perianthium* duplex, utrumque 5-partitum; *exterius* semicalycinum persistens; *interius* petaloideum marcescens. *Urceolus* simplex, membranaceus, ex ipsa basi perianthii. *Stamina* numerosa, distincta, apici columnæ brevissimæ genitalium inserta. *Styli* 5. *Stigmata* peltata. *Capsula* inflata, quinquevalvis. *Semina* axibus valvularum inserta.

Frutices

It has been already remarked, that there is nothing in the structure of the column in *Rafflesia* to enable us to determine the

Frutices (*forsan decumbentes*). Folia *alterna simplicia subdentata,* stipulis *lateralibus* (*utrinque solitariis geminisve*) *distinctis, callosis.* Flores *axillares subsolitarii, pedunculis, quandoque brevissimis, basi bracteolatis.* Urceolus *abbreviatus, ore denticulato.* Filamenta *simplici serie, viginti circiter.* Antheræ *incumbentes, lineares.* Capsula *chartacea.* Semina *axibus filiformibus valvularum subsimplici serie inserta, pedicellata, punctata, omnino* Passifloræ.

PATRIA. Africa æquinoctialis.

1. S. *pubescens,* ramis tomentosis, foliis oblongo-ovatis basi obtusis: adultis pube rara conspersis, urceolo barbato.

   Smeathmannia pubescens. *Solander l. c.*

   Loc. Nat. Guinea, prope Sierra Leone, *Smeathman, Afzelius.*

2. S. *lævigata,* ramis glabris, foliis oblongis ovatisve basi acutis: adultis glaberrimis utrinque nitidis, urceolo imberbi inciso.

   Smeathmannia lævigata. *Soland. l. c.*

   Loc. Nat. Guinea, prope Sierra Leone, *Smeathman, Afzelius, Purdie.*

3. S. *media,* ramis glabris, foliis obovato-oblongis basi obtusis: adultis utrinque glabris subopacis.

   Loc. Nat. Guinea, prope Sierra Leone, *Smeathman.*

   Forsan varietas *S. lævigatæ.*

The affinity of *Smeathmannia* to *Paropsia* of M. du Petit Thouars will probably be admitted without hesitation; and its exact agreement in fruit in every important point, both with this genus and with *Modecca,* seems to leave no doubt of its belonging to *Passifloreæ,* with which it agrees in habit even better than *Paropsia,* and certainly much more nearly than *Malesherbia,* considered by M. de Jussieu (in *Flor. Peruv.* iii. p. xix.) as belonging to the same family.

Smeathmannia differs then from the other genera of *Passifloreæ* solely in its greater number of stamina, which, however, may not be really indefinite; and an approach to this structure is already known to exist in an unpublished genus (*Thompsonia*) discovered in Madagascar by Mr. Thompson, of which the habit is entirely that of *Deidamia,* and whose stamina are equal in number to the divisions of both series of the perianthium.

But from *Smeathmannia* the transition is easy to *Ryania,* which differs chiefly in its still greater number of stamina, in the want of petals or inner series of perianthium, in the single style being only slightly divided, and in the form of its placentæ.

And *Ryania,* although it has a superior ovarium, may even be supposed to be related to *Asteranthos* and *Belvisia,* if the fruit of these two genera should prove to be unilocular with several parietal placentæ.

position

position of the ovarium in the female flower; but that from another consideration there seems a somewhat greater probability of its being superior. If, however, it were even inferior, the objection to the affinity in question would not be insuperable, the relationship of *Homalinæ* to *Passifloreæ* being admitted.

If *Napoleona* or *Belvisia* be really allied to *Passifloreæ*, which is very doubtful, however, and can only be determined by an examination of the fruit, it may also be compared with *Rafflesia*. At first sight this singular genus seems to resemble our plant in several respects, particularly in the manner of insertion of its sessile flower into the branch, in the bracteæ surrounding the ovarium, the confluence and dilatation of its filaments, and in the existence of a double corona. But some of these points are obviously unimportant; and the comparison between the corona of the great flower and the double corolla of *Belvisia* will probably be considered paradoxical*.

It seems unnecessary to compare *Rafflesia* with *Cucurbitaceæ*, to which it could only be considered as approaching, if its affinity to *Aphyteia* should appear probable, and the relationship of that genus to *Cucurbitaceæ*, suggested chiefly by the structure of antheræ, were at the same time admitted. The

* M. de Beauvois, in his account of *Napoleona* (*Flore d'Oware* ii. *p.* 32.), has mentioned a genus allied to it, which has been since published by M. Desfontaines under the name of *Asteranthos*. These two genera are without doubt nearly related; and, even independent of the structure of fruit, which in both remains to be ascertained, possess sufficient characters to separate them from every known family, as M. de Jussieu is disposed to think; and certainly from *Symploceæ*, where M. Desfontaines has placed them.

In adopting the generic name proposed by M. Desvaux for *Napoleona*, this order may be called

BELVISEÆ.

Calyx monophyllus, limbo diviso, persistens. *Corolla?* monopetala, plicata, (multiloba vel indivisa; simplex v. duplex) decidua. *Stamina* vel definita v. indefinita; basi corollæ

The points of agreement between *Rafflesia* and *Sterculiaceæ* are the division and form of the coloured perianthium, the sessile antheræ terminating a column, and the separation of sexes.

On these resemblances, however, I am not disposed to insist; and I am even persuaded that there is here no real affinity; though I confess I have no other objections to state to it than the valvular æstivation of the perianthium, and the absence both of the corona and of the annular elevations at the base of the column in *Sterculiaceæ*.

To conclude this part of my subject, I am inclined to think that *Rafflesia*, when its structure is completely known, will be found to approach either to *Asarinæ* or *Passifloreæ*; and that, from our present imperfect materials, notwithstanding the very slight affinity generally supposed to exist between these two orders, it cannot be absolutely determined to which of them it is most nearly allied.

The only question that remains to be examined respecting *Rafflesia* is, whether the flower with its enveloping bracteæ and reticulate base do not together form a complete plant parasitic on the root from which it springs?

corollæ inserta. *Ovarium* inferum. *Stylus* 1. *Stigma* lobatum v. angulatum. *Pericarpium* baccatum, polyspermum.

Frutices (Africæ æquinoctialis; an etiam Brasiliæ?) *foliis alternis integerrimis exstipulatis, floribus axillaribus lateralibusve solitariis.*

BELVISIA, *Desvaux in Journal de Botanique appliq.* iv. *p.* 130.
Napoleona, *Palisot de Beauvois Flore d'Oware* ii. *p.* 29.

Calyx 5-fidus. Corolla? duplex; *exterior* indivisa; *interior* (e staminibus sterilibus connatis formata?) multifida. *Stamina: Filamenta* 5 dilatata biantherifera.

ASTERANTHOS, *Desfont. in Mem. du Mus.* vi. *p.* 9. *tab.* 3.

Calyx multidentatus. *Corolla?* simplex multiloba. *Stamina* indefinite numerosa distincta.

That

That such was probably the case, occurred to me on first inspecting the flower-bud; the opinion being suggested not only by the direct origin of the flower from the root, but more particularly by the disposition, texture and colour of the bracteæ; in which it so nearly resembles certain plants known to be parasites, as *Cytinus*, *Cynomorium*, *Caldasia* of Mutis*, *Balanophora*, and *Sarcophyte*.

In this opinion I was confirmed on seeing the figure of the plant mentioned in Dr. Arnold's letter, as probably related to the Great Flower, though not more than three inches in diameter.

The plant in question, which had been found in Java by Dr. Horsfield several years before the discovery of *Rafflesia Arnoldi*, only, however, in the unexpanded state, is represented in the figure referred to as springing from a horizontal root in the same manner as the Great Flower; like which also it is enveloped in numerous imbricate bracteæ, as having a perianthium of the same general appearance, with indications of a similar entire annular process or corona at the mouth of the tube, a pustular inner surface, and a central column terminated by numerous acute processes. It is therefore unquestionably a second species of

* In the Journal of Science, vol. iii. p. 127, from El Semanario del Nuevo Reyno de Granada, for 1810. To this genus belong *Cynomorium jamaicense*, and perhaps *cayanense* of Swartz, an unpublished species from Brazil, and some other plants of equinoctial America. Before the appearance of *Caldasia* in the Journal of Science, I was aware that these plants formed a genus very distinct from *Cynomorium* (Journal of Science, iii. p. 129.), but I had not given it a name, which is still wanting, that of *Caldasia* having long been applied to a very different and well known genus.

The new name, however, may be left to M. Richard, who is about to publish, and who will no doubt illustrate with his usual accuracy, the plants formerly referred to *Cynomorium*, of one of the species of which (*C. cayanense*) he is himself the discoverer.

the

the same genus*: but the branch with leaves which, though separately represented in the drawing, is considered as proceeding from the same root, appears to me, on an examination of the specimen figured, to belong to a species of *Vitis*: and on mentioning my supposition respecting the Great Flower to Dr. Horsfield, he informed me he had observed this second species of the genus also connected with leaves of a different kind, and which seemed likewise to be those of a *Vitis*†.

Even with all the evidence now produced, I confess I was inclined, on a more minute examination of the buds of *Rafflesia Arnoldi*, to give up the opinion of its being a parasite; on considering, first, the great regularity of the reticulate base, which yet, externally at least, seemed to be merely a dilatation of the bark of the root: secondly, the nearly imperceptible change of structure from the cortical part of the base to the bracteæ in contact with its upper elevated margin: thirdly, the remarkable change of direction and increased ramification of the vessels of the root at the point of dilatation; a modification of structure which must probably have taken place at a very early stage of its growth: and lastly, on finding these vessels in some cases penetrating the base of the column itself (*plate* 22. *f.* 1.).

But to judge of the validity of these objections, it became necessary to examine the nature of this connection in plants known

* This second species may be named *Rafflesia Horsfieldii*, from the very meritorious naturalist by whom it was discovered. At present, however, the two species are to be distinguished only by the great difference in the size of their flowers; those of the one being nearly three feet, of the other hardly three inches in diameter.

† Isert (in *Reise nach Guinea, p.* 283.) mentions a plant observed by him in equinoctial Africa, parasitic on the roots of trees, consisting, according to the very slight notice he has given of it, almost entirely of a single flower of a red colour, which he refers to the Linnean class Icosandria, and compares in appearance, I suppose in the young state, to the half of a Pine-cone. It is not unlikely that this plant also may be really allied to *Rafflesia*, the smaller species of which it probably resembles in appearance.

to be parasitic on roots; in those especially, which in several other respects resemble *Rafflesia*, as *Cytinus*, *Aphyteia*, *Cynomorium*, and *Balanophora*. On this subject I cannot find that a single observation has hitherto been made, at least with respect to the genera now mentioned. Sufficient materials, indeed, for such an investigation are hardly to be expected in collections, in which the parasite is most frequently separated from the root; and even when found in connection with it, is generally in a state too far advanced to afford the desired information. I consider myself fortunate, therefore, in having obtained specimens of several species where the union is preserved; and the result of the examination of these, though not completely satisfactory, has been to lead me back to my first opinion, namely, that the Great Flower is really a parasite, and that the root on which it is found probably belongs to a species of *Vitis*.

An account of some of the more remarkable of this class of parasitic plants, to which a few years ago I had paid particular attention, may hereafter form the subject of a separate communication. At present I shall confine myself to such general observations on the class as relate to the question respecting *Rafflesia*.

In the first place, plants parasitic on roots are chiefly distinguishable by the imperfect development of their leaves, and the entire absence of green colour; an observation which, as applying to the whole tribe, was I believe originally made by Linnæus*. In both these points they agree with *Rafflesia*.

A second observation which may be made respecting them is, that their seeds are small, and their Embryo not only minute, but apparently imperfectly developed; in some cases being absolutely undivided, and probably acotyledonous, even in plants which, from their other characters, are referable to dicotyledonous, or at least to monocotyledonous families.

* *Fungus Melitensis, p.* 3. *Amœn. Acad.* iv. *p.* 353.

In

In these points the structure of *Rafflesia* remains to be ascertained. In the mean time, however, if it be considered as a parasite, and as likely to agree with the other plants of the tribe in the state of its embryo, it may be remarked, with reference to the question of its affinities, that such a structure would approximate it rather to *Asarinæ* than to *Passifloreæ*.

My principal and concluding observation relates to the modes of union between the stock and the parasite. These vary in the different genera and species of the tribe, which may be divided into such as are entirely dependent on the stock during the whole of their existence, and such as in their more advanced state produce roots of their own.

Among those that are in all stages absolutely parasitic, to which division *Rafflesia* would probably belong, very great differences also exist in the mode of connection. In some of those that I have examined, especially two species of *Balanophora**, the nature of this connection is such, as can only be explained on the supposition that the germinating seed of the parasite excites a specific action in the stock, the result of which is the formation of a structure, either wholly or in part, derived from the root, and adapted to the support and protection of the undeveloped parasite; analogous therefore to the production of galls by the puncture of insects.

On this supposition, the connection between the flower of *Rafflesia* and the root from which it springs, though considerably different from any that I have yet met with, may also be explained. But until either precisely the same kind of union shall have been observed in plants known to be parasitic, or, which would be

* *Balanophora fungosa* of Forster, and *B. dioica*, an unpublished species, lately sent by Dr. Wallich from Nepaul, where it was discovered by Dr. Hamilton, and also found in Java by Dr. Horsfield.

 still

still more satisfactory, until the leaves and fructification belonging to the root to which *Rafflesia* is attached shall have been found, its being a parasite, though highly probable, cannot be considered as absolutely ascertained*.

ADDITIONAL OBSERVATIONS.

Read November 21, 1820.

Since my paper on *Rafflesia*, or the Great Flower of Sumatra, was read to the Society, further information respecting it has been received from Sir Stamford Raffles and Mr. Jack, which will form an important addition to my former account.

Sir Stamford, in a letter to Mr. Marsden, states the following particulars:

"I find the *Krûbût* or Great Flower to be much more general and more extensively known than I expected. In some districts it is simply called *Ambun Ambun*. It seems to spring from the horizontal roots of those immense Climbers, which are attached like cables to the largest trees in the forest. We have not yet met with the leaves. The fruit also is still a desideratum. It is said to be a many-seeded berry, the seeds being found in connection with the processes on the summit of the pistillum. I have had buds brought in from Manna, Sillibar, the interior of Bencoolen and Laye; and in two or three months we expect the full-blown flower. It takes three months from the first appearance of the bud to the full expansion of the flower; and the flower appears but once a year, at the conclusion of the rainy season."

* Annals of Philosophy for September 1820, p. 225.

The

The first communication from my friend Mr. Jack consisted of a description of recent flower-buds, at that time regarded by him as hermaphrodite, but which he has since ascertained to be male. It is unnecessary to introduce this description here, as it essentially agrees with that already given, and may also be considered as superseded by the important information contained in the following letter, which I have more recently received from the same accurate botanist.

"MY DEAR SIR, "Bencoolen, June 2, 1820.

"Since I wrote you last I have ascertained several particulars respecting the Gigantic Flower of Sumatra, additional to those contained in the account forwarded by Sir Stamford Raffles to Mr. Marsden, and by him communicated to you, which it may be interesting to you to know.

"Numerous specimens, in every stage of growth, have been sent from various parts of the country, which have enabled me to ascertain and confirm every essential point. The first and most unexpected discovery is, that it has no stem of its own, but is parasitic on the roots and stems of a ligneous species of *Cissus* with ternate and quinate leaves: I have not ascertained the species*. It appears to take its origin in some crack or hollow of the stem, and soon shows itself in the form of a round knob, which, when cut through, exhibits the infant flower enveloped in numerous bracteal sheaths, which successively open and wither away as the flower enlarges, until, at the time of full expansion, there are but a very few remaining, which have somewhat the appearance of a broken calyx. The flowers I find to be unisexual, which I did not before suspect, and consequently diœcious. The male I have already described. The female differs very

* Mr. Jack has since determined it to be *Cissus angustifolia* of Roxburgh. *Fl. Ind.* i. *p.* 427.

little

little in appearance from it, but totally wants the globular anthers, which are disposed in a circle round the lower side of the rim or margin of the central column of the male.

"In the centre of this column or pistillum in the female are perceived a number of fissures traversing its substance without order or regularity, and their surfaces are covered with innumerable minute seeds. The flower rots away not long after expansion, and the seeds are mixed with the pulpy mass.

"The male and female flowers can be distinguished by a section not only when mature, but at every stage of their progress. I have made drawings of every essential part, which I hope soon to be able to send home, together with a further account than I have yet had leisure to make.

"I remain, &c.

"William Jack."

The two principal desiderata respecting *Rafflesia*, namely, the satisfactory proof of its being a parasite, and the discovery of the female flower, are now therefore supplied.

Additional information, however, on several points is still wanting to complete the history of this extraordinary plant.

Thus, it would be interesting, by a careful examination of the buds in every stage, to trace the changes produced in the root by the action of the parasite, and especially to ascertain the early state of the reticulate base, which I have ventured to consider as a production of an intermediate nature, partly derived from the root itself, and which I suppose will be found to exist before the bracteæ become visible.

Further details are also wanting respecting the circumstance of its being found both on the roots and stems of the *Cissus* or *Vitis**,

* As these two genera differ from each other merely in number of parts, I have formerly proposed to unite them under the name of *Vitis*. (*Tuckey's Congo, p.* 465.)

no

no instance being, I believe, at present known of parasites on roots, which likewise originate from other parts of the plant.

Many important particulars remain to be ascertained respecting the *Pistillum*.

From Mr. Jack's account it appears that the seeds are found in the substance of the column; in other words, that the ovarium is superior. But as I have formerly remarked, that in the male flower the same internal structure seems to be continued below the apparent base of the column, it is possible that in the female the production of seeds may extend to an equal depth: the ovarium would then become essentially inferior, as far at least as regards the question of the affinity of the plant. This point would be determined by a description of the unimpregnated ovarium, a knowledge of whose structure is also wanting to enable us to understand the nature of the ripe fruit, and especially the origin and direction of the fissures, on the surfaces of which the seeds are produced.

It is desirable likewise to have a more particular description of the *Stigma*, to which Mr. Jack seems to refer both the corniculate processes of the disk, and the undivided limb of the column. These parts in the male flower have no evident papulose or secreting surface; for the hispid tips of the processes can hardly be regarded as such. But it is not likely that in the female flower they are equally destitute of this, which is the ordinary surface of a stigma; and it appears to me more probable that such a surface should be confined to a definite portion, probably the tips, of the corniculate processes, than that it should extend over every part of the apex of the column.

Whatever may be the fact, my conjecture respecting these processes being possibly imperfect stamina is completely set aside; though it is still difficult to connect their number and arrangement with the supposed structure of ovarium.

Until

Until these points are ascertained, and the seeds have been examined, the question of the affinities of the genus will probably remain undetermined. In the mean time it may be remarked, that as far as the structure of the fruit of *Rafflesia* is yet understood, it may be considered as in some degree confirming the proposed association of the genus with *Asarinæ*; especially with *Cytinus*, in which the ovarium is unilocular, with numerous parietal placentæ extending nearly to the centre of the cavity, and having their surfaces covered with minute ovula.

From the appearance of the ripe fruit of *Aphyteia*, a similar structure may be supposed to exist also in that genus, of which, however, the unimpregnated ovarium has not been examined. But these two genera are parasitic on roots, and have also their stigmata remarkably developed; and although *Rafflesia* probably differs from both of them in having a superior ovarium, I have endeavoured to show that this difference alone would not form an insuperable objection to their affinity.

EXPLANATION OF THE PLATES

RELATING TO

RAFFLESIA ARNOLDI.

Plate XV.

The expanded Flower reduced to somewhat less than $\frac{1}{3}$ of its natural size; the scale given on the plate being too long by nearly $\frac{1}{7}$.

XVI.

A Flower-bud covered with its bracteæ, of the natural size.

Plate

Plate XVII.

The underside of the same Bud ; to show the root, the reticulate base with the circular elevation in which it terminates, and the origin of the outer b acteæ. Natural size.

XVIII.

A Flower-bud, of which the bracteæ, whose insertions are shown, are removed. Natural size.

XIX.

A different view of the Bud in the same state, to show the æstivation and veins of the segments of the perianthium. Natural size.

XX.

Fig. 1. A vertical section of the Bud deprived of its bracteæ : exhibiting the principal vessels of the column and perianthium, and the structure of the root, especially the change in the direction, increased ramification and termination of its vessels at the base of the parasite. Natural size.

2. One half of the vertically-divided perianthium of the same Bud, in which the internal surface of the tube, corona and segments is shown. Natural size.

XXI.

Fig. 1. A Flower-bud, its bracteæ and perianthium being removed, to show the column with the two annular processes at its base. Natural size.

2. A portion (about $\frac{1}{5}$) of the column, of which part of the limb is removed, to show the cavities of the neck, into which the antheræ are received. Natural size.

3. The portion of the Limb removed from fig. 2. with its antheræ immersed in their proper cavities. Natural size.

Fig. 4. An Anthera, magnified three diameters, as are figures 5, 6, 7 and 8.

5. A transverse section of the same above the middle.

6. A transverse section of the same below the middle.

7, 8. Vertical sections of the same.

9. Pollen, magnified 200 diameters.

Plate XXII.

Fig. 1. A vertical section of part of the base of the smaller Flower-bud, showing the vessels of the root, some of which appear to penetrate the substance of the parasite. Natural size.

2, 3. Portions of the column of the expanded Flower, nearly corresponding with those of the Bud, in *Pl.* 21. *f.* 2 & 3. Natural size.

4. Anthera of the expanded Flower, magnified 3 diameters, as are figures 5 and 6.

5. Transverse section of the same below the middle.

6. Vertical section of the same.

7. Pollen of the expanded Flower, magnified 200 diameters.

8. A transverse section of the Root, magnified 3 diameters.

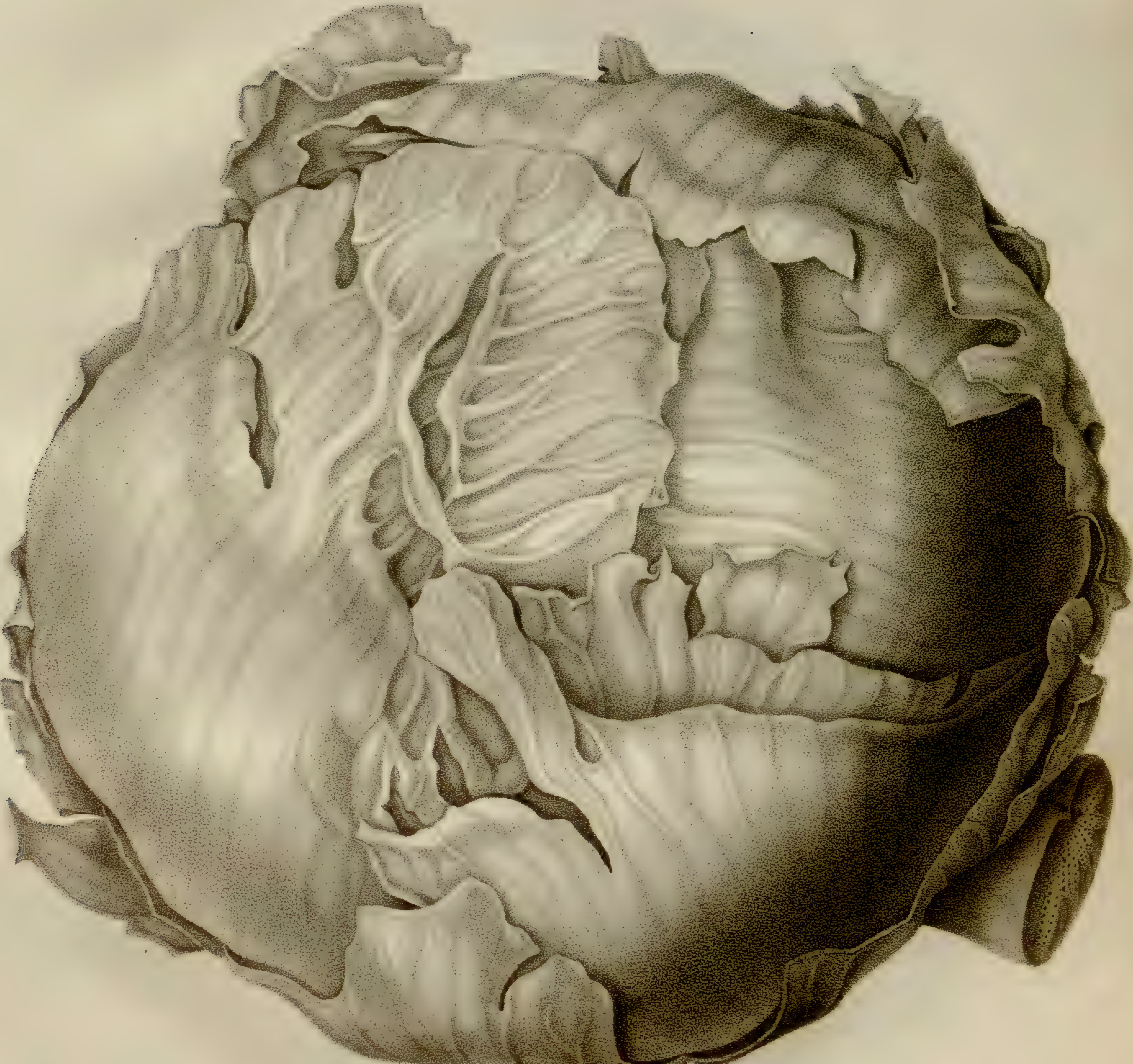
XVI. *De-*

Reduced Scale of one Foot.

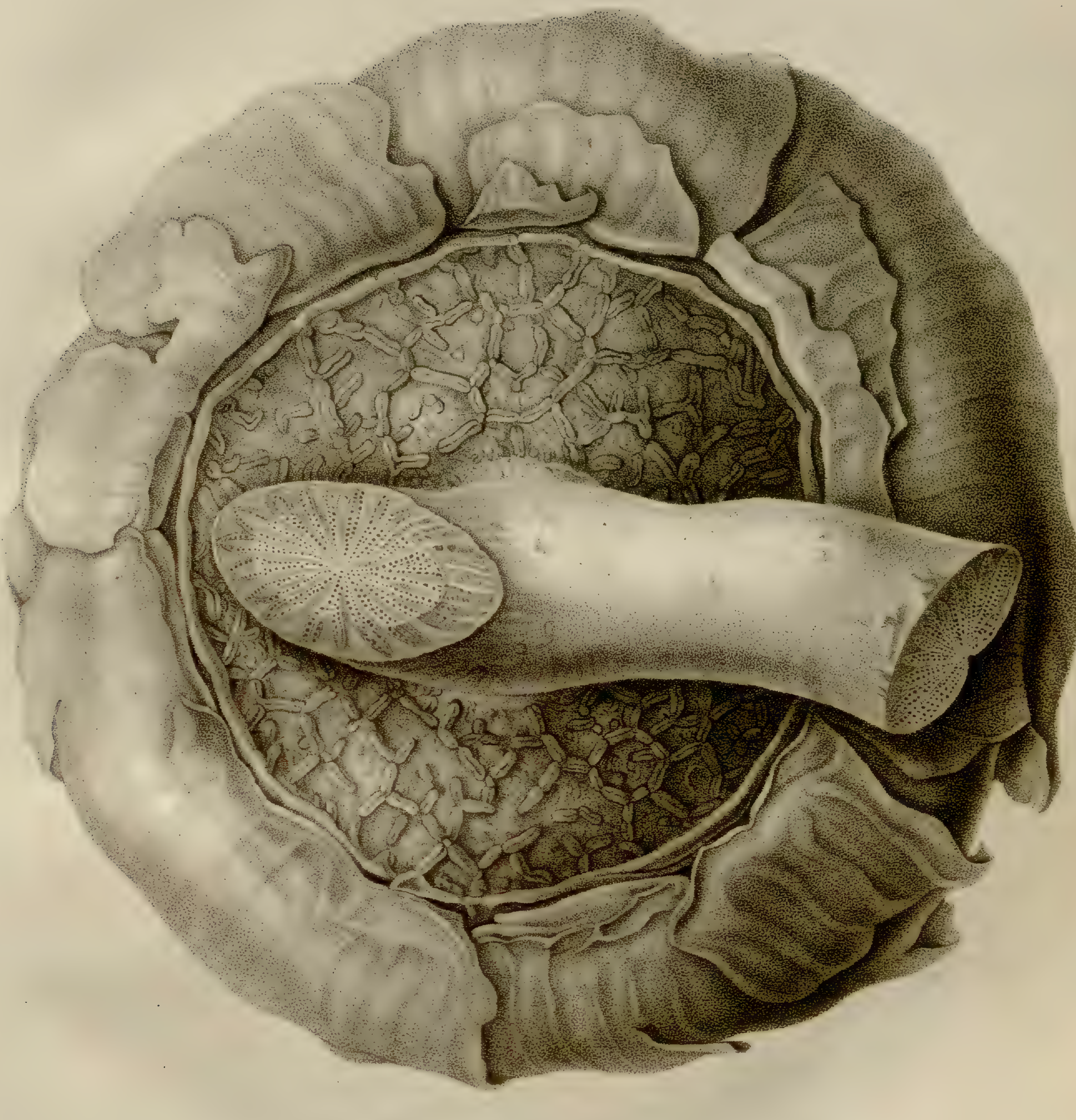
Rafflesia Arnoldi.

Franz Bauer del.

J. Basire sc.



Fran: Bauer del. J. Basire sc.



Fran: Bauer del.

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Fran: Bauer del.

Jas Basire sc.

Franz Bauer del.

J. Basire sc.

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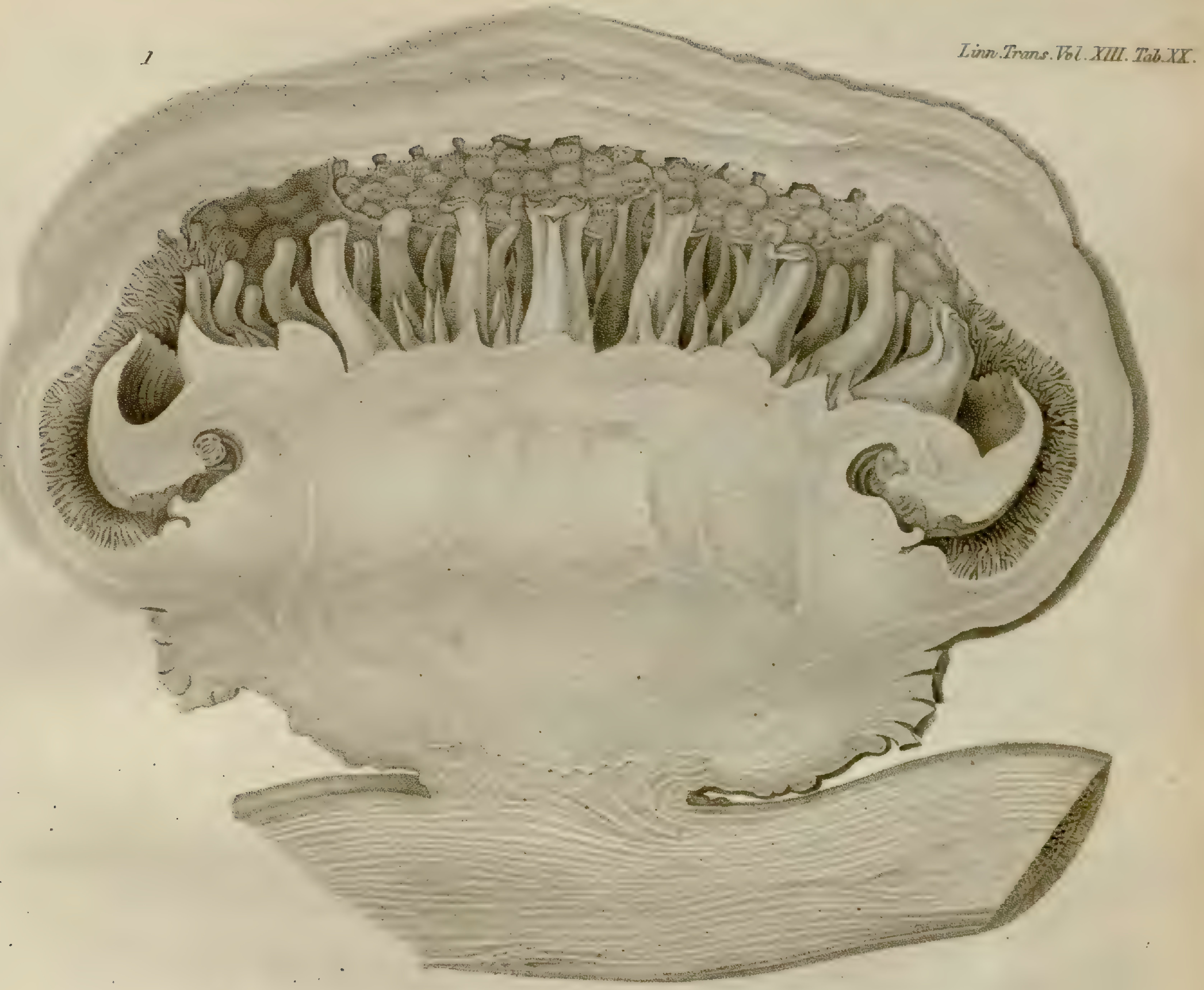
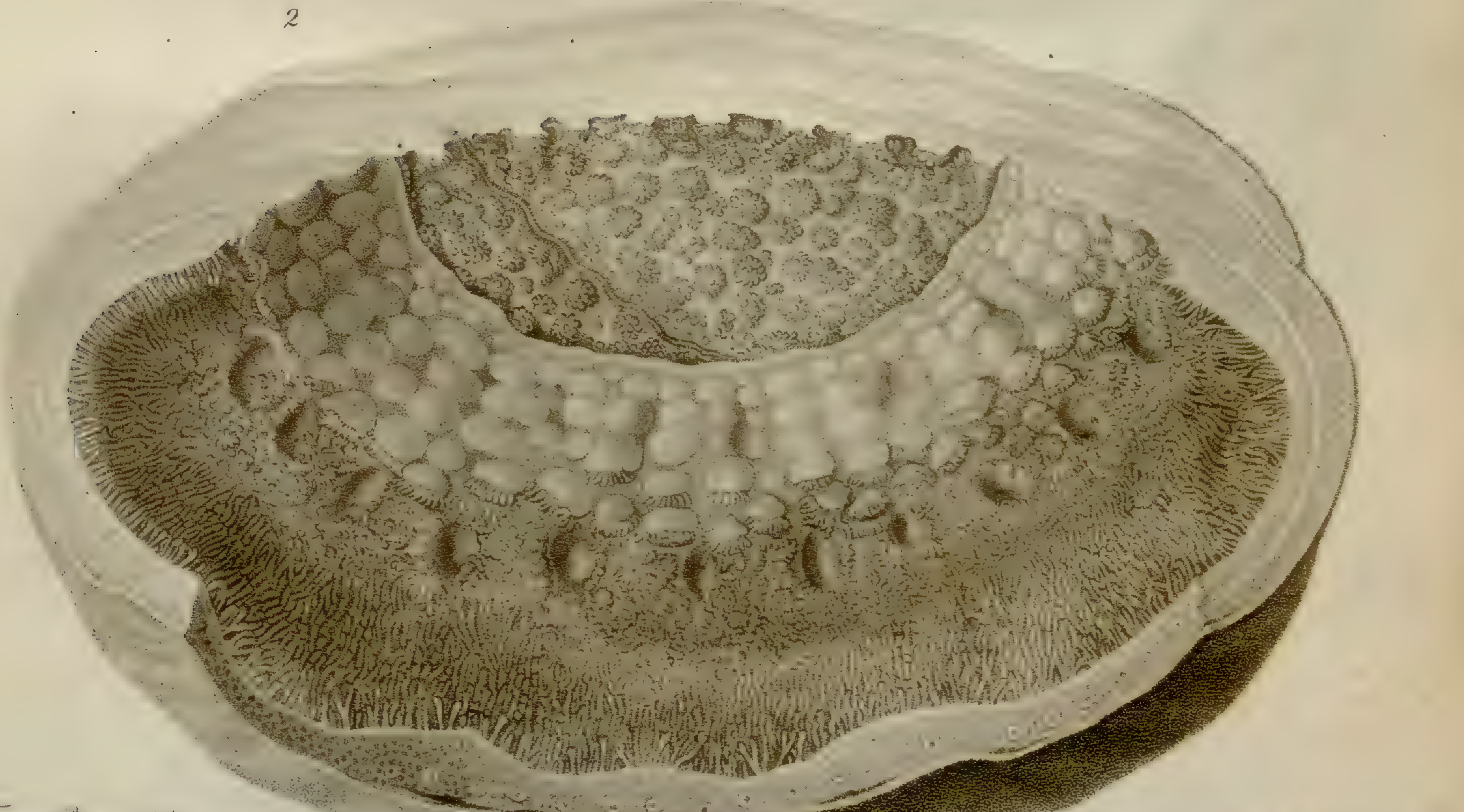


2



Franz Bauer del.

J. Basire sc.

Franz Bauer del.   Js Basire sc.

Franz Bauer del. Jas. Basire sc.

J. Curtis sculp.

Canis familiaris
Var: Sumatrensis.

XVI. *Descriptions of the Wild Dog of Sumatra, a new Species of Viverra, and a new Species of Pheasant. By Major-General Thomas Hardwicke, F.R.S. and L.S.*

Read May 2, 1820.

CANIS FAMILIARIS. VAR. SUMATRENSIS.

WILD DOG OF SUMATRA.

TAB. XXIII.

COUNTENANCE of a Fox; nose pointed; apex black; whiskers long and black; eyes oblique; ears erect, more rounded than in the common Fox or Jackall, very hairy; muzzle foxy brown much mixed with black; tail pendulous, bushy, most so about the middle, smaller at the origin; hair black, reaching to the leg-joint.

The animal stands high on its legs, which are long in proportion to its size. Feet firmly planted, but not resting on the heel; toes four in front, large and strongly united; a fifth very small, on the inner side of the foot and remote from the rest; claws long, compressed, strong, not retractile; above the small toe is a round tubercle or callosity on each leg.

The general colour of the animal a foxy-ferruginous red, varying to lighter shades on the belly and inside the thighs.

The action of the animal in confinement is, like most other wild animals, restless in the extreme while any one stands near; and if teased, it emits a most fœtid urine. Its voice is more of a cry than a bark.

The length of the subject about 24 inches; height 14 inches.

 The

The resemblance between this animal and the Wild Dog of the Ramghur hills, called *Quão*, is strikingly close; the colour of both is the same, the black bushy tail the same, as also the form of the nose; but the ears of the Sumatra Dog are more rounded.

It has also a great affinity to the Dog of New Zealand. One of these animals was exhibited in the Museum of Mr. Brooks, Blenheim-street, Great Marlborough-street, in April 1815.

VIVERRA? LINSANG.

TAB. XXIV.

Head small, ovate, much pointed, finely tapering, the upper jaw much longer than the under; whiskers numerous, setaceous, longer than the head, pointing backwards; eyes equi-distant between the nose and ears, small, circular; ears rounded, of a moderate size; neck almost twice the length of the head; body twice the length of the neck; tail nearly as long as the body, cylindrical; legs of nearly equal length, and, in proportion to the size of the animal, rather long; feet in proportion, planted like those of the feline genus; toes five on each foot, before and behind; claws very small, retractile, and so obscured in the fur as to be hardly visible.

The general colour of the animal is a yellowish-white, covered with longitudinal broad lines, and long confluent spots of black; the spots on the legs and lowest line of the abdomen more distinct.

The tail annulated with six bands of black, alternating with as many of the ground colour of the animal, yellowish-white.

The belly, under-part of neck and inner side of the legs yellowish-white; nose black, and a black streak extending from the posterior corner of the eye to the side of the neck.

Length

Viverra? Linsang.

J. Curtis del. et sculp.

	Inches.
Length of the head	3,5
Do. of the neck to base of the tail .	11,6
Do. of the tail	11,3
Total length	26,4

	Inches.
The height of the animal to the nose when standing	8,7$\frac{3}{4}$
At the rump	6,3

A knowledge of this animal was communicated to the Asiatic Society by Major Farquhar, from Malacca, from whence he sent a dead specimen. In most respects the specimen was in good condition, but the teeth were wanting.

It is a native of the island of Java, and is said to be a carnivorous animal.

PHASIANUS CRUENTUS.

Size of a small fowl; length seventeen inches; bill short, $\frac{8}{10}$ of an inch, convex, very strong, black, the base red, including the nostrils; temples naked; skin red, but feathered between the bill and the eye; from the base of the upper mandible rises a small crest of short various coloured feathers, inclining backward.

The colour of the plumage above is dark ash, with white shafts, the coverts of the wings variously tinged with green, with broad strokes of white through the length of each feather; primaries and secondaries brownish-black, with white shafts; the feathers of the chin deep crimson, neck much mixed with white; on the breast, belly and sides the feathers are lance-shaped, of various length, the tips green with crimson margins, collectively resembling dashes of blood scattered on the breast and belly; vent rufous. The tail consists of twelve

sub-

sub-equal feathers, about six inches in length; shafts white, rounded, the ends whitish; the coverts both above and beneath a rich crimson red.

Legs deep red, armed with three unequal spurs, but varying in number in different subjects; toes long; claws strong, long and black.

The hen is similar to the cock in plumage and all other marks, but smaller and without spurs.

This fine species of Pheasant is a native of the Nepaul hills; and it is to the liberal contributions of the Honourable Edward Gardner, Resident at the Court of Nepaul, that I am indebted for the opportunity of presenting to the Linnean Society this description, from well preserved dead subjects in my possession.

XVII. *De-*

XVII. *Descriptive Catalogue of a Zoological Collection, made on account of the Honourable East India Company, in the Island of Sumatra and its Vicinity, under the Direction of Sir Thomas Stamford Raffles, Lieutenant-Governor of Fort Marlborough; with additional Notices illustrative of the Natural History of those Countries. By Sir Thomas Stamford Raffles, Knt. F.R.S. Communicated by Sir Everard Home, Bart., F.R.S. and L.S.*

Read December 5, 1820.

THE interest excited by the researches carried on during my administration in Java, early induced me to extend similar inquiries to the more extensive island of Sumatra; and I esteemed myself fortunate in obtaining the assistance of Dr. Joseph Arnold, a gentleman already advantageously known to the scientific world. Unhappily he fell an early sacrifice to his zeal in the cause, and his loss cannot be more regretted in a public view, than it is lamented by those who were best able to appreciate his amiable disposition and private virtues. He lived, however, long enough to lay the foundation of an extensive plan of research. I was subsequently induced to engage the services of two French gentlemen, who appeared qualified to assist in the collection and preservation of the zoological specimens, and to furnish such anatomical details as might require observation in recent subjects, it being stipulated that on the payment of the monthly sum of 500 dollars, the whole of their collections and observations should be the exclusive property of the East India Company. On these terms I intrusted to them the charge of the collection,

collection, and used all my influence to bring into it whatever was interesting in zoology. A year had scarcely elapsed when circumstances rendered it necessary to discontinue this arrangement. They advanced pretensions diametrically opposed to the spirit and letter of their engagement, and altogether inconsistent with what I had a right to expect from them, or they from me. Thus situated, I had no alternative but to undertake an immediate description of the collection myself, or to allow the result of all my endeavours and exertions to be carried to a foreign country. I should observe, that the papers delivered to me as containing all their observations, were for the most part so speculative and deficient in the kind of information required, that I could make no use of them myself, nor give them to the world under the sanction of my authority. I have therefore returned them, and left these gentlemen at liberty to publish or amend them as they think proper. They are young men not deficient in zeal, and though misled for the moment by private and national views, will, I doubt not, profit by the means I have afforded them, and eventually contribute to our further knowledge of the zoology of these islands.

I have thought it necessary to say thus much respecting these gentlemen, in order to prevent the possibility of misrepresentation; and I need only add, that as my descriptions have been made without assistance from them, and may contain particulars not only unknown to them, but at variance with their ideas, they are of course not responsible for any part of them. The Catalogue now submitted has been drawn up by myself from actual examination of the subjects, combined with the result of extensive personal inquiries among the best informed natives of the country. It has no pretensions beyond accuracy and the simple statement of facts.

PART

Part I. MAMMALIA.

SIMIA.

Of this genus nine or ten species are known to the natives of these islands, the greater part of which are in the collection. The first is the well known

SIMIA Satyrus *Linn.*

Orang Utan of the Malays. اورڠ هوتن

Of this a living specimen from Borneo was sent to the Menagerie at Calcutta in 1819. Native information gives reason to believe that it also exists in Sumatra; it is there known by the name of Orang Pandak (Pygmy), and the accounts given of it agree exactly with the Orang Utan of Borneo. It is frequently confounded with the Orang Kubu and Orang Gugu described by Mr. Marsden, which, though often the subject of fable and exaggeration, appear to exist on the island as a distinct race of men, almost as hairy and wild as the real Orang Utan.

The observation of Linnæus, that the nail of the thumb is wanting on the hind-feet, is confirmed by the above specimen, and is probably correct in all the true Orang Utans.

SIMIA syndactyla.

Siamang of the Malays. سيامڠ

This new species of Gibbon is abundant in the forests near Bencoolen, where they are seen in large companies, making the woods echo with their loud and peculiar cry.

It is of a jet-black colour throughout; is upwards of three feet in height, and of a robust and muscular frame. It agrees with the

the *Simia Lar* of Linnæus in being tailless, having naked callosities and arms reaching to the feet. It differs, however, essentially in having the index and middle toes, or rather fingers, of the hind feet united as far as the middle of the second phalanx; in having two loose and naked folds of skin on the throat, which I have observed to be occasionally inflated with air; and in being entirely black, with the exception of a few brown hairs on the chin, which appear to become grey with age. The hair is long and soft; the face is without hair and black, as are also the breasts of the female. The orbits of the eyes are circular and remarkably prominent. The canine teeth are long.

Besides the specimens in the collection, I have recently procured a living Siamang, which is very tame and tractable: in fact, he is never happy but when allowed to be in company with some one.

Samang or Siamang is the name given to certain tribes of aboriginal inhabitants of the Malay peninsula. See Preface to Marsden's *Grammar*, and *Asiatic Researches*, vol. xii.

There is said to be a white variety of the Siamang found at Tapus and Barus; and I have accounts of one of these having been lately seen at Palembang, but it is probably nothing more than an accidental variety.

SIMIA Lar *Linn.*

There is found on the Peninsula of Malacca a smaller Gibbon than the preceding, which is probably the true *Simia Lar*. It does not exceed two feet in height, and is black, with a white circle round the face. It is there called Ungka etam. اڠكَ هيتم

I have now in my possession a living specimen of another Gibbon called here Ungka puti, اڠكَ ڤوتي which appears nearly related to the Wouwou وو٢ of Java, or *Simia leucisca* Schr. In size it is considerably less than the Siamang, not exceeding two feet,

feet, and is altogether of a more delicate and slender frame. Its colour is a dirty-yellowish white, which becomes nearly brown on the under and inner parts, contrary to what takes place in most animals, which are lighter below. The face and hands are black; the hair is softer and more woolly than that of the Siamang, and its cry is softer and less harsh.

Both these are of a more timid disposition, and have neither the strength nor boldness of the Siamang.

With regard to the Ungka puti, it is the general belief of the people of the country that it will die of vexation if it sees the preference given to another; in corroboration of which I may add, that the one in my possession sickened in this situation, and did not recover until relieved from the cause of vexation by his rival the Siamang being removed to another apartment.

Another variety has been met with at Bencoolen, which only differs in being of a light-brown colour, with a still lighter circle round its black face.

In none of these are there any naked folds of skin on the throat, and all the toes are separate. These marks are fully sufficient to distinguish them from the Siamang, which I therefore propose to establish as a distinct species under that appellation, if the characteristic one of *S. syndactyla* be not thought preferable.

SIMIA Carpolegus.

Bruh of the Malays. بروق

This is a very common Baboon in the vicinity of Bencoolen, where the inhabitants frequently train it to ascend the trees for the purpose of gathering coco-nuts, a service in which it is very expert.

It is about two feet high when sitting: colour yellowish-brown mixed with black on the back, and pale or whitish in front.

 The

The hair of the body is short and close. On the top of the head the hairs are black, and diverge horizontally; those of the eyebrows, which unite above the nose, are also black and are radiated upwards. There is scarcely any beard. The face is naked and flesh-coloured; the ears, hands and callosities are the same, and the extremity of the prepuce is vermilion. The muzzle is somewhat prominent, and the nostrils open anteriorly. The eyes are brown. Ears roundish, obtusely pointed behind. Cheeks pouched. Tail short and tapering, about six inches long, inserted very high, and curling downwards. The callosities on the nates are large. The thumb is a little longer in proportion to the fingers than in many other species. The last molar has five tubercles. In this species, as in many others of the genus, there is a sac under the os hyoides which communicates with the larynx.

The natives distinguish three varieties of Bruh: the Bruh setopong, Bruh selasi, and Bruh puti. The Bruh setopong is the largest, the colour on the back verging to olive, and light in front. It is the most docile and intelligent of the whole, and is much prized in consequence. When sent to gather coco-nuts, he selects the ripe ones with great judgment, and pulls no more than he is ordered. The other two are darker coloured, less intelligent, and more intractable.

SIMIA cristata.

Chingkau of the Malays. جيڠکوق

Frequent in the forests near Bencoolen.

This species is about two feet long, with a tail nearly two and a half; when standing on all fours it is fourteen inches high. It is of a dark-grey colour, the hairs being in general black with white points. The face, fore-arms, hands, feet, back, and

upper

upper side of the tail are nearly black, the under part of the body paler. (The same colour would in a horse be called iron-grey, or grey with black points.) The disposition of the hairs on the head is peculiar; they are long, and diverge round the face, forming on the top a kind of crest. Beard scanty. Face and ears bare and nearly black. Orbits large. Nose rather elevated between them, but quite flat at the nostrils, which are situated at some distance above the upper lip, and open laterally. Head and face small. Ears large and rounded. Canines long. Neck short. Callosities large. Tail thin and tapering, without any tuft. Thumbs on the fore-hands remarkably short. It is altogether of a light and slender make. The young Chingkaus are of a reddish fawn-colour, forming a singular contrast with the dark-coloured adults.

A variety of this is described by the natives to be of a light-grey or whitish colour, and called Chingkau Puti.

SIMIA MELALOPHOS.

SIMPAI of the Malays. سيمڤي

Frequent in the neighbourhood of Bencoolen.

In general form and appearance this species nearly resembles the preceding, but is a little larger, and of a very different colour, being of a bright fawn-colour, mixed with black on the head, back and shoulders. The whole of the under parts is nearly white. Head and face small, with hair diverging as in the preceding, but forming a longer and more distinct crest on the head composed of black hairs, and also forming a tuft on each cheek of a fawn-colour graduating into white. The forehead below the crest is of a bright fawn-colour. Beard scanty. The orbits, nose and ears scarcely differ in form from the

the preceding. Face bare, of a blueish colour, and slightly wrinkled. The line of the face is singularly straight and perpendicular. The ears nearly of the same colour. The palms and soles of the hands and feet are black. The thumb of the hands very short. Callosities large. Tail long and tapering, exceeding thirty inches.

The hair of this and the preceding species is long, and in this soft and silky.

SIMIA fascicularis.

Kra of the Malays. كرا

Frequent in the forests of Sumatra and the Malay islands, where they are met with in large companies.

The body is about twenty inches long, and the tail a little more. The back and upper part of the head are of a reddish-brown colour; the tail and sides of the body grey, which becomes still lighter on the inside of the limbs and lower part of the body and face. The face is brown, and covered with short light grey hairs. The cheeks are furnished with tufts of the same colour, much longer than the beard. The eyelids, particularly the upper ones, are white. The eyes are brown, the eyebrows prominent, and the muzzle projecting. The nose is prominent between the eyes, and flat at its point, where the nostrils open obliquely some way above the lip. Cheeks pouched. Ears roundish, obtusely pointed behind. Canines short. Callosities strong. Thumb of the hands short.

The Malay name has frequently a close resemblance to the cry of the animal it designates; and this is remarkably the case in the present instance, as well as in the Simpai, Wouwou and others.

The

The Kra is not easily domesticated. The natives distinguish a whiter variety, with a reddish shade on the back.

Besides the Kra above described, there is a smaller species called the Kra Buku, which only differs in size, and in wanting the circle of hair round the face. This little animal, which is less than a foot in length, is equally common in the other Malay islands. The head is remarkable in having very little hair on the temples, in which it strikingly differs from the larger species.

SIMIA MAURA? *Linn.*

LOTONG of the Malays. لوتوڠ

Found at Singapore and Penang.

This species is often eighteen or twenty inches long and twelve or thirteen in height when on all fours. The tail is some inches longer than the body. Its colour is chiefly black. The hair of the arms, legs, and top of the head is tipped with grey. The inside of the thighs and lower part of the abdomen are entirely white; a line of white also extends from thence to the throat; the breast and axillæ are light grey. The hands, feet, ears and face are black. The lips are furnished with short whitish hairs mixed with a few longer black ones. Beard scanty, and composed of a few black hairs. The cheeks have also some black hairs. The hair diverges from the crown of the head so as to project over the forehead in front, and to form a kind of crest behind. Head and face small. Nose flat at the point, where the nostrils open laterally. It is not easily tamed.

LEMUR TARDIGRADUS *Linn.*

KUKANG (Malay). كوكڠ

Of this the natives distinguish a large and a small variety: the former they call Bruh samundi, and describe it as a larger and

more

more active animal, of a grey colour, with a black stripe along the back. The Malays have a superstitious aversion to these animals, and never keep them in their houses, from an idea that they bring misfortunes and ill luck.

GALEOPITHECUS rufus *Pallas.*

Lemur volans *Linn.*

Kubung of the Malays. كوبغ

Frequent in the Malay peninsula and islands.

This animal is too well known to require description: it usually hangs from the branch of a tree suspended by its four hands. The wing-like membrane cannot serve the animal to fly, but when extended acts as a kind of parachute, by which it is enabled to make long leaps from tree to tree. There are six pectinate incisors in the lower jaw, and four in the upper, of which the middle ones are remote; two canines in each jaw, and five molars on each side. The canines are peculiar in having two fangs, and the molars have the same number. The larynx is osseous. The animal produces two young at a time, and the number of mammæ correspond. The two pair are situated near to each other on the breast a little below the axillæ. The colours on the back of the young are more distinct and variegated than in the adult. Mr. Marsden's figure gives a very good idea of this animal.

VESPERTILIO Vampyrus. Var. β. rubricollis *Geoff.*

Vespertilio Ferrum equinum *Linn.*

Kaluang of the Malays. كلواغ

Of this there are two distinct varieties: one large, and having a complicated nasal membrane; the other smaller, and having a simple semilunar membrane over the nose. In one of these, besides

besides the two pectoral mammæ, there are two others situated a little above the pubes, as already observed by Mr. Montagu in the 9th volume of the *Transactions of the Linnean Society*. These are not found in the *V. Vampyrus*.

MANIS PENTADACTYLA *Linn.*

PANGOLING SISIK. ڤڠݢوليڠ سيسق

Or, TANGILING. تڠݢيليڠ

CANIS FAMILIARIS *Linn.* VAR. SUMATRENSIS.

WILD DOG OF SUMATRA*.

Of this I carried a living specimen to Bengal in 1818; it died soon after, and the preserved skin was sent to Mr. Henry Colebrooke, in England, by my friend Dr. Wallich. They are numerous in the forests of the interior, where they are said to hunt in packs.

It is of a small size, of a brownish-red colour, lighter beneath, with an elongated head, and a bush-like tail somewhat resembling that of a Fox. Body slender. Ears short and erect. It is wild and untameable, and seems to resemble most the Australasian Dog, or Dingo.

How far this differs from either of the wild Dogs of Java, Dr. Horsfield will be able to decide.

FELIS.

Of this genus two species only are in the collection, the Royal Tiger, and a species of Tiger-cat. The latter is precisely the same with the *Felis Bengalensis*, Bengal Tiger-cat described by Pennant, and is called by the Malays Rimau bulu, ريمو بولو

* For a description and figure of this Dog, see p. 235, tab. XXIII.

 Tigers

Tigers are very numerous in Sumatra, and are very destructive on the west coast. The natives distinguish several varieties, such as the Rimau Kumbang, or black Tiger; the Rimau samplat, and others.

It may be proper also to notice the variety of the domestic Cat peculiar to the Malayan Archipelago, and remarkable by having a twisted or knobbed tail, in which particular it agrees with that of Madagascar. Sometimes they have no tail at all. This coincidence with the Madagascar variety is the more remarkable, as the similarity between the language and customs of the inhabitants of Madagascar and the Malay islands has frequently been a subject of observation.

Besides these, native accounts have been obtained of two other species existing in Sumatra, the Chigau or Jigau, جيگو and the Rimau dahan.

The former, called the Rimau mang'in in the southern districts, is described as larger than the Tiger, more dangerous and destructive, and as making his attack in a different manner, not crouching and darting from a covert, but rushing furiously and steadily forward, and even forcing his way into villages and houses. It is stated to have a mane of long hair on its head and neck, to have a tuft at the extremity of its tail, to be of a more uniform and dark colour, and to have a larger and longer head than the Tiger. All these particulars of form and habits indicate its being a kind of Lion. It has been seen in various parts of the country, but is by no means common.

The Rimau Dahan, ريمو داهن is about the size of a Leopard, but is of a darker colour and less regularly spotted. It lives principally on trees, pursuing and feeding on birds, &c., and is said by the natives to be in the habit of sleeping stretched across the fork of a large bough.

MEPHITIS

MEPHITIS Javanensis *Desm.*

Telagu of the Malays. تلكو

Found in Sumatra and Java. From the latter it has already been sent to Europe by Mr. Leschenault, and I believe by Dr. Horsfield.

It is nearly related to the *Viverra Mephitis* Linn. of America, the type of this genus, but differs in having a very short tail not exceeding an inch in length, and in having but one line of white along the back, which covers the whole crown of the head, and becomes narrower as it runs backward to the tail, which is also white. The rest of the body is of a dark-brown colour. The snout is long and pointed. The direction of the hair on the forepart of the body is peculiar, being directed forwards under the throat, and upwards and forwards on the back of the head and neck. The five toes of the fore-feet are furnished with long claws fitted for digging. It has six incisors, two canines, and five molars in each jaw, of which the first three are not tuberculated.

When irritated, or in danger, it emits from its rectum a fluid of most insupportable stench.

VIVERRA Zibetha *Linn.*

Tangalung of the Malays. تغكالوغ

This animal is kept by the natives for the purpose of obtaining the well known perfume, which they call *jibet* or *dedes.* It is contained in a double sac under the anus.

The animal is above two feet long; the tail shorter than the body, and annulated. A black stripe runs the whole length of the back; there are several longitudinal stripes on the back of the

 neck,

neck, and a broad black band encircles the lower part of the throat. The sides of the body are spotted, and the spots become undulated in the limbs. The hair is rather short and close.

The natives distinguish a smaller variety by the name of Tanggalung Padi.

VIVERRA Genetta *Linn.*

Musang sapulut. موسڠ سڤولت

This appears to be the true Genet.

It is of a dark-grey colour, with stripes and spots of black. The tail is of the same colour mixed with black, but not white at the tip like the following.

VIVERRA Musanga.

Musang bulan of the Malays. موسڠ بولن

This animal, figured by Mr. Marsden in his *History of Sumatra*, is nearly related to *V. Genetta*, but must be considered a distinct species.

It is of a dusky fulvous colour mixed with black; the tail is of the same colour, except about two inches at the point, where it is white, and is about as long as the body. The space from the eyes to the ears is white; there are some long black bristles above the eyes, and some other white ones a little way behind them. The nose is prominent at the extremity, and deeply furrowed between the nostrils. The muzzle is long and pointed. The feet are five-toed. The animal is about the size of an ordinary Cat.

VIVERRA

VIVERRA? Binturong.

Intermediate between *Viverra* and *Ursus* is an animal called Binturong, بنتورڠ found at Malacca by Major Farquhar, who communicated an account of it, accompanied with a specimen and drawing, to the Asiatic Society. It has not been made public, and it may therefore be interesting to give the following particulars as furnished to me by that gentleman, in whose possession I saw a living specimen in 1819.

The body of this animal is about two feet and a half in length; tail nearly the same, bushy and prehensile; height from twelve to fifteen inches. It is entirely covered, with the exception of the legs and face, with a thick fur of strong black hair. Its general appearance and habit is slow and crouching, the body long and heavy, and low on the legs; the tail is thick at the root, gradually diminishing in size to the extremity, where it curls inwards. The muzzle is short and pointed, somewhat turned up at the nose, and is covered with bristly hairs, brown at the points, which lengthen as they diverge, and form a peculiar radiated circle round the face, giving the countenance a striking and remarkable aspect. The eyes are large, black and prominent; and the ears are short, rounded, edged with white, and terminated by tufts of black hair. There are six short rounded incisors in each jaw, two canines, which are long and sharp, and six molars on each side: of these, in the upper jaw, the three first are pointed; in the lower jaw the two first are pointed, and the last is smaller and imperfect. The molars are remote from the canines in the lower jaw, and approximate in the upper. The feet are five-toed, with large strong claws; the soles are bare, and applied to the ground throughout the whole of their length; the hind ones longer than the fore. The hair on the legs is short and of a brownish

tinge.

tinge. When at rest the animal coils himself, the tail encircling the body.

It climbs trees assisted by its prehensile tail, in which it has uncommon strength. Major Farquhar kept one alive many years; it lived both on animal and vegetable food; was particularly fond of plantains, but would also eat fowls' heads, eggs, &c. Its movements are slow, and it is rather of a timid disposition; it sleeps much during the day, but is more active at night.

This animal seems to have considerable affinity to the *Viverra caudivolvula* of America; but in general appearance and nocturnal habits it resembles the *Ursus Lotor* or Racoon.

LUTRA.

Of this genus there are two species in Sumatra known by the common appellation of Anjing Ayer, or Dog of the Waters. The largest is properly distinguished by the name of Simung, سيموڠ and the smaller by that of Barang Barang, بارڠ٢ or Ambrang.

The latter appears to be nearly allied to the *Lutra Lutreola* (*Mustela Lutreola* Linn.), being about a foot and a half in length, of a beautiful glossy-brown colour, and white on the mouth and throat. The feet are covered with hair, but the toes are not of equal length. The tail is shorter than the body, covered with hair, thick at the base, and tapering to a point.

URSUS Malayanus. Bruang. بروڠ

This deserves to be ranked as a distinct species from the common Bear, and from that of the continent of India. The most striking difference is in the comparative shortness of its hair, and the fineness and glossiness of its fur; in which particular

cular it appears to resemble the American Bear. It is further remarkable in having a large heart-shaped spot of white on the breast. The muzzle is of a ferruginous colour. It stands lower, but is a stouter and better proportioned animal than the common Bear.

When taken young they become very tame. One lived for two years in my possession. He was brought up in the nursery with the children; and, when admitted to my table, as was frequently the case, gave a proof of his taste by refusing to eat any fruit but mangosteens, or to drink any wine but Champaign. The only time I ever knew him to be out of humour was on an occasion when no Champaign was forthcoming. It was naturally of a playful and affectionate disposition, and it was never found necessary to chain or chastise him. It was usual for this Bear, the cat, the dog, and a small blue mountain bird or Lory of New Holland, to mess together and eat out of the same dish. His favourite play-fellow was the dog, whose teasing and worrying was always borne and returned with the utmost good humour and playfulness. As he grew up he became a very powerful animal, and in his rambles in the garden, he would lay hold of the largest plantains, the stems of which he could scarcely embrace, and tear them up by the roots.

A female of this species was sent to England last year by the William Pitt.

SOREX.

Of this genus the collection contains a small variety of the *S. cœrulescens*, or Musk Rat of Bengal. In it, as in the Bengal species, the musky fluid is emitted from a single gland on each side of the body.

TUPAIA.

TUPAIA.

Gen. Char. Snout elongated.
Teeth, Incisors above 4 remote.
below 6 (or 4?) leaning forwards, the middle ones approximate.
Canines two on each side both above and below, remote.
Molars, three on each side both above and below.
Feet five-toed.
Habit and tail of a Squirrel.

TUPAIA ferruginea.

Tupai press. Malay توڤي ڤريس

This singular little animal was first observed tame in the house of a gentleman at Penang, and afterwards found wild at Singapore and in the woods near Bencoolen, where it lives on the fruit of the Kayo Gadis, &c. It has the tail and general appearance of a Squirrel, united to the elongated head and dentition of a *Sorex*. It further differs from the latter genus in being a lively playful animal, with large eyes suited to day-light, and in not being nocturnal or subterranean in its habits.

The head is prolonged into a conical snout; the upper jaw and lip not however projecting much beyond the lower. Incisors four above, rather remote and sharp, six below, the middle ones smaller, the lateral ones inclining forwards. Canines four in each jaw, remote from the incisors in the upper. Six conical molars in each jaw. Eyes large and bright. Ears roundish. Colour of a rusty brown on the back and sides, whitish on the belly; tail greyish-brown, the hairs being a mixture of black and white. Length of the body about six or eight

eight inches. Tail not quite so long, hairy like that of a Squirrel, but rounder. Five toes on all the feet; the middle three longest; all furnished with curved claws.

These animals are as tame and sprightly as Squirrels. The tame one above mentioned was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast- and dinner-table, where he partook of fruit and milk.

TUPAIA Tana.

This species very nearly resembles the preceding one, but is larger, the length of the body being nine inches, and that of the tail about seven. Colour above nearly the same, but the lower parts of a ferruginous red. The tail in this species is flat like that of a Squirrel, and is of a reddish colour.

In the only specimen yet procured of this last, there are but four incisors in the lower jaw, yet in every other respect the teeth agree with the former species. As the specimen was prepared by a native before it came into my hands, further examination will be necessary to ascertain whether this difference may not have been the effect of accident in the preparation.

These animals are generally known by the country people under the name of Tupai tana; and it is said they are always found on or near the ground. It is not impossible we may succeed in finding further varieties; at all events, the two noticed are sufficiently distinct to form separate species, and, I should presume, to justify the adoption of a new genus: most certainly they will not come under any of the genera yet noticed.

HYSTRIX.

Of this there are two species, one long-tailed, the *H. fasciculata*, the other the Landak, لندق, figured by Mr. Marsden in his

his *History of Sumatra*, under the name of *Hystrix longicauda*. That figure is a good and accurate representation of the animal, with the exception of the fore-feet being delineated as five-toed, while in reality they are only four-toed, the place of the thumb being supplied by a tubercle. The name *longicauda* is perhaps objectionable, as the tail of this species is much shorter than that of the *H. fasciculata*. It seems questionable whether the *H. macroura* of Seba is really different from the *H. fasciculata*, and whether two species are not confounded under it.

MUS Sumatrensis.

A drawing and specimen of an animal, which appears related to the *Mus Pilorides*, was forwarded from Malacca by Major Farquhar to the Asiatic Society at the same time with the Binturong. I am informed by him, that it is not uncommon at Malacca, and is perhaps to be found in most parts of the Malay peninsula. It is called by the natives Dekan, دكن, and by Europeans in India the Bamboo Rat, from its being found principally about Bamboo hedges, and being said to live on their roots.

The body is about seventeen inches in length, ten inches in circumference, and the height at the shoulder about five. The tail is six inches long, tapering, and blunt at the points, naked and scaly. The body is covered with rough greyish hair, brownish on the back. The head round and lighter coloured. Incisors large, two in each jaw. Eyes small. Ears naked. Fore-feet four-toed; hind-feet with a short fifth toe.

SCIURUS.

Besides the *Sciurus maximus*, the Tupai Jinjang or Tankrawa, توڤي جنجڠ of the Malays, and the *S. bicolor* or Java Squirrel, which are frequent in the Malay islands, a third species, which may be named

SCIURUS

SCIURUS Affinis,

was found abundantly in the woods of Singapore (on the occupation of that station by the British in 1819), agreeing with the two former in having a flat nail on the very short thumb of the fore-feet, but differing in colour, being of a cinereous grey or brownish on the upper part of the head, body and tail, and on the outside of the limbs, and being nearly white on the under and inner parts. It is about the size of the *S. bicolor*. The separation of the colours on the body is not so abrupt as in that species, a stripe of reddish-brown marking the transition. Grey is the most usual colour of the upper parts; but it appears to vary considerably at different seasons (perhaps at rutting time), changing to a light brown, and even to a dusky yellow. The first specimens, that were procured in February, were of this latter colour; five months after they were found of a grey colour. One of them, which has been in my possession about ten months, and is now alive, has not changed colour perceptibly in that time. This animal is remarkably tame, and has become a regular and very amusing guest at the breakfast-table.

A sufficient number of specimens of the *S. maximus* and *bicolor* has not been examined, to decide whether they are subject to the same variations of colour. A young one of the latter, procured from the straits of Sunda, had the whole of the tail of the same fulvous colour as the belly, while in adult ones it is entirely black, like the upper part of the body. These facts indicate the necessity of caution in multiplying the number of species in this genus on mere diversities of colour, as intermediate varieties will often be found to connect species apparently sufficiently remote.

SCIURUS Vittatus.

This species, which appears to be related to the *Sciurus ginginianus*, is smaller than the preceding, and is frequent in the woods

of Bencoolen, living principally on palm-trees. It pierces a hole in the coco-nuts for the purpose of drinking the contained milk. It is called Tupai, توڤي which appears to be the generic name of the Squirrels.

It is about eight inches in length, and the tail is about the same. The ears are round, resembling in form the human, and not bearded. The colour on the upper part of the body and on the tail is a mixed yellowish-grey, each hair being twice annulated with black and fawn-colour. The lower parts are brownish-red or fulvous. On the sides, from the shoulder to the hind-leg, is a stripe of white, separated from the fulvous part by one of black. The tail is round, and has the hair uniformly disposed, not spreading towards each side, in which particular it resembles the *S. Guerlingus* (*Myoxus Guerlingus* Pennant). It carries it erect like the other Squirrels, and it is of the same colour as the body, with the exception of the extremity, which is furnished with some fulvous hairs. The scrotum is very large and pendent. The eyes are surrounded by a fawn-coloured ring. The whiskers are black.

There is another species nearly related to the preceding, but much smaller, being only about five inches in length. It has the same distinguishing characteristics of rounded ears, round tail, and large scrotum, but differs in wanting the white stripe on the sides; in the under parts being of a greyish-white, not fulvous; in the tail wanting the fulvous hairs at its point, and in having the light and dark colours more distinct and somewhat annulated. In other respects, and in the colour of the back, it exactly resembles the former, and is perhaps no more than a variety.

Of Flying Squirrels there are two species. The *S. Petaurista* is, according to Major Farquhar, a native of Malacca, and there called Chin Krawa. The second species was lately sent to me from

from Singapore, and is without doubt the *Sciurus Sagitta* of Linnæus, but quite a different animal from that figured by Shaw (*Gen. Zool.*) under this name. The flying membrane does not extend from the head to the hands, but only between the limbs, and is beautifully ciliated. The tail is flat and distichous, of an oblong lanceolate form. The scrotum is particularly large.

MOSCHUS.

The Malays distinguish three species or varieties of this genus, viz. the Napu, ناڤو the Kanchil كنچيل and the Pelandok.

MOSCHUS Javanicus *Pallas*.

Napu. ناڤو

This is the largest of the three. It is about twenty inches long and thirteen in height. It stands considerably higher behind than at the shoulder. It is of a mottled ferruginous colour on the back, grey varied with white on the sides, and white below and on the inside of the thighs. The tail is from two to three inches long, tufted, white below and at the end. A white stripe runs along the base of the lower jaw on both sides to the posterior angle; the space between is also white, and gives origin to three diverging white stripes, which run to the shoulders and middle of the breast. The top of the head is very flat, and of the same ferruginous colour as the back, which, however, becomes darker on the back of the neck. A nearly black line runs from each of the eyes to the nose. A grey stripe runs for some way along the middle of the belly. It has short spurious hoofs.

This species frequents thickets near the sea-shore, and feeds principally on the berries of a species of *Ardisia*. It can be easily tamed if taken young, and will become quite familiar.

MOSCHUS

MOSCHUS Kanchil. كنچيل

This species is smaller than the preceding, being about fifteen inches long by about nine or ten in height. In form it nearly resembles the Napu, but is lighter and more active. Its colour is very different, being of a deep-red brown, approaching to black on the back, and becoming of a bright bay on the sides. It is white on the belly and inside of the legs. It has three white stripes on the breast like the Napu, but differently disposed. The stripe on each side of the lower jaw is prolonged to the shoulder, becoming narrower as it goes backwards; the middle stripe is broadest below, and narrows to a point above, never uniting with the lateral stripes. In the Napu, on the contrary, the three white stripes originate from one point between the maxillary ones, which appear like the commencement of another pair; and all three become broader behind. The head of the Kanchil is not so flat, and the muzzle is more curved above. The black lines from the eyes to the nose are wanting, but a well defined black line runs down the back of the neck, which is not present in the Napu. A brown line runs from between the fore-legs to the middle of the belly. This species is further distinguished by having long upper canines curving backwards; while in the Napu they are short and straight. The tail is from one and a half to two inches long, tufted, white below and at the end. It has spurious hoofs like the former.

These differences are constant at every age, and they differ not less in their habits and manners. This species is found in the depth of the forests, and feeds chiefly on the fruit of the Kayo briang (*Gmelina villosa* Roxb.). It will live in confinement, but never becomes tame like the preceding. If ever it succeeds in breaking its confinement, it endeavours to make its

escape

escape to the woods. It is a much swifter and lighter animal, and is said to be so alert and cunning, that it is a common Malay proverb to designate a great rogue, to be as cunning as a Kanchil. Of this cunning many instances are related by the natives. If taken in the nooses laid for them, they will, when the hunter arrives, stretch themselves out motionless and feign to be dead; and if he is deceived by this manœuvre and unties them, they seize the moment to start on their legs and disappear in an instant. A still more singular expedient however is mentioned: that when closely pursued by dogs, the Kanchil will sometimes make a bound upwards, hook itself on the branch of a tree by means of its crooked tusks, and there remain suspended till the dogs have passed beneath. No portion of this activity and quickness is ascribed to the Napu or Pelandok; and to this difference of disposition is attributed the Kanchil frequenting the forests without fear of the Tigers and beasts of prey; while the latter two, more timid, seek safety in the thickets nearer to human habitations, where they are less exposed to such enemies.

The Pelandok is the least of the three in point of height, but has proportionably a larger and heavier body: it has also a larger eye.

CERVUS.

Of this genus there are three kinds frequent in Sumatra and the adjacent islands, viz. the Rusa, the Rusa ubi, and the Kijang.

CERVUS Axis.

Rusa. روسا

This is, no doubt, the greater *Axis* of Pennant, and is abundantly distinct from the common or spotted *Axis*.

It is of a large size, often standing as high as an ordinary sized pony of the country, which is about four feet or twelve hands.

Its

Its horns are large, furrowed and rugged, and, like the other kinds of *Axis*, three-branched. Its colour is pretty uniformly of a greyish-brown, darker on the belly; the hinder parts and tail have somewhat of a ferruginous shade, and the inside of the limbs is whitish. The head is handsome; the muzzle black, and soft at its extremity. The chin is whitish. The eyes have the usual lacrymal furrow. The female has no horns; in the male they are large, frequently more than two feet in length, varying somewhat in the degree of divergence, and in relative thickness and proportions; their colour is more or less dusky or brown. The burr at the base is tuberculated; the lowest branch is directed forward, and the upper, which is shorter, looks backwards. The canines of the upper jaw are rather long in old individuals. The ears are large, rather naked, soft and whitish at the edges, and have some pencils of long hair at the lower and inner margin.

This species is elegantly formed, and in its habits is peculiarly gentle and tractable. It is frequently kept tame, and has been commonly known among Europeans in these islands by the erroneous name of Elk. The pair now in my possession were presented to me by the King of Acheen.

A variety of this is described by the natives as of a darker colour, being of a deep brown or nearly black, and called Rusa etam or Rusa Kumbang. It is rather smaller than the common kind, but has exactly the same horns, and in fact seems to differ in nothing but colour.

The spotted *Axis* met with in these islands appears to be the same as that of Bengal, and has probably been introduced from thence.

The middle *Axis* of Pennant is probably the small species most frequent in Java, and generally dried as an article of food, called *Dinding* throughout the eastern islands. A white individual of this

this species was sent to me from Macassar in the island of Celebes, and lived some years in my park at Buitenzorg.

CERVUS MUNTJAK? *Schreb.*

KIJANG. كيجڠ

The Kijang is smaller than the other species of deer, being less than four feet in length, and not exceeding two feet in height. The horns are seated on an elevated cylindric base or pedicel covered with skin and hair. The pedicel is about three inches long; the horn about four, deeply furrowed, with a prominent burr at the base, immediately above which it divides into two branches, one short and pointing inwards; the other erect, and curved inwards and backwards at the point. The pedicels are an elongation of the *os frontis*, and their roots are continued forwards above the eyes to the nose, forming two strong prominent ribs on the face. On the forehead between these is a double longitudinal fold of the skin, forming in some sort a middle rib, much less conspicuous than the lateral ones. The female has no horns, and the ribs of the face are obscure. The male has long canines in the upper jaw resembling tusks, sharp, and curved backwards. In form this deer is remarkably elegant; the legs are slender and graceful; the body is round, compact, and rather large in proportion to the legs. The fur is very fine, close and glossy. The colour is a bright bay or reddish brown, lighter below, and mixed with brown on the neck. The inside of the thighs, the region of the pubes, and the under-side of the tail, are of a pure white. The chin and lower jaw is whitish. The muzzle is nearly black, which colour extends along the middle rib, and from thence in a stripe running upwards to the extremity of each pedicel. In the female the place of the horns is marked by

by a tuft of black hairs. The ears are rather small, and thinly covered with hair. Lachrymal furrows as usual. Spurious hoofs small and blunt.

This species is found in the neighbourhood of Bencoolen, and is figured by Mr. Marsden in his *History of Sumatra.* That drawing, however, must have been taken from a young individual before the horns had fully formed or begun to branch. Even the burr, which afterwards becomes so conspicuous, appears to have been wanting.

Of the Rusa ubi, روسا اوبي, called also Rusa saput, روسا سافوت, and Rusa tunjuk, a specimen has not been procured; but it is described by the natives to be inferior in size to the Rusa, of a reddish colour, and to have unbranched horns covered with hair to within a short distance of the point.

None of these species of deer appear to shed their horns yearly like the European ones. The first horn is commonly a small and imperfect one, and falls early. It is replaced by the perfect one, which is permanent, and is never lost unless by accident, when it is not replaced. This is probably the case with all the deer of tropical climates.

ANTILOPE Sumatrensis *Penn.*

Kambing utan. كمبيڠ هوتن

Wild Goat of Sumatra.

The figure of this animal, given in the last edition of Mr. Marsden's *History of Sumatra* is very accurate, but does not fully express the character of spirit and vivacity which marks the living subject. I kept one for some months, but found it impossible to tame him; and he finally died from impatience of confinement. It is a powerful muscular animal. The detailed description in Shaw's *Gen. Zool.* is generally correct.

BOS.

BOS.

There is a very fine breed of cattle peculiar to Sumatra, of which I saw abundance in Menangkabu when I visited the capital of that country in 1818. They are short, compact, well made animals, without a hump, and almost without exception of a light fawn-colour relieved with white. The eyes are large and fringed with long black eye-lashes. The legs are delicate and well shaped. Among all that I saw I did not observe any that were not in excellent condition; in which respect they formed a striking contrast to the cattle generally met with in India. They are universally used in agriculture, and are perfectly domesticated. This breed appears to be quite distinct from the Banting of Java and the more eastern islands.

Of the Buffalo, the white variety is the most frequent at Bencoolen. It does not appear to differ from the black in any thing but the colour, which is a reddish white.

EQUUS.

The Sumatran horses are small, strong and hardy. Those of the northern parts of the island, particularly Acheen, are the most prized. The Batta horses are rather larger, very strong, but not handsome. They are distinct breeds from the horses of Java and Bima, which are nearly of the same size, about twelve hands.

ELEPHAS.

Wild Elephants are extremely numerous in the forests of Sumatra; but few attempts have been made to catch and domesticate them. At Acheen alone have they been trained to the service of man; and I have now in my possession a young one presented to me by the King of that country.

RHINOCEROS Sumatranus.

Badak. بادق

Two-horned Rhinoceros of Sumatra.

Dr. Bell's description and representation of this animal in the *Philosophical Transactions* are extremely correct. The drawing of the skull is however erroneous in one particular; the incisor bone of the upper jaw is straight and horizontal, and not curved as there represented. It must also be remarked, that the original number of incisor-teeth is four in each jaw, the same as in the one-horned Rhinoceros of India. Of these incisors, two in each jaw are very small, and soon fall out, and were therefore probably wanting in the adult head figured by Dr. Bell. The small incisors of the upper jaw are situated behind the large and persistent ones; those of the lower jaw between them. The number of persistent molars in each jaw is six on each side, as represented by Dr. Bell; but it appears that there is a seventh, which soon falls out. The number in the young subject is six, with the rudiment of a seventh behind. As this seventh advances, the first molar begins to be obliterated, and falls out before the last arrives at its full size; so that at no period are there seven completely formed teeth existing in the jaw. The skin of the Sumatran Rhinoceros is much softer and more flexible than that of the Indian one, and is not, like it, corrugated into plates of mail. It has however some doublings or folds, particularly round the neck, shoulders and haunches, rather more distinct and defined than in Dr. Bell's drawing. The natives assert that a third horn is sometimes met with; and in one of the young specimens procured, an indication of the kind was observed. The female has a larger and heavier head than the male, but is similar in other respects.

They

They are not bold, and one of the largest size has been seen to run away from a single wild Dog.

The one-horned Rhinoceros of India is not known to the natives of this part of Sumatra; and the single horns which are occasionally procured, appear to be merely the larger horns of the two-horned species separated from the small one. There is, however, another animal in the forests of Sumatra never yet noticed, which in size and character nearly resembles the Rhinoceros, and which is said to have a single horn. This animal is distinguished by having a narrow whitish belt encircling the body, and is known to the natives of the interior by the name of Tennu. تنوق It has been seen at several places; and the descriptions given of it by people quite unconnected with each other, coincide so nearly, that no doubt can be entertained of the existence of such an animal. It is said to resemble in some particulars the Buffalo, and in others the Badak or Rhinoceros. A specimen has not yet been procured; but I have several parties on the look-out, and have little doubt of soon being able to forward a more accurate description from actual examination.

It should be remarked, that the native name, Tennu, has, until lately, been understood to belong to the Tapir. It is so applied at Malacca, and by some of the people at Bencoolen. In the interior however, where the animals are best known, the white-banded Rhinoceros is called Tennu, and the Tapir Gindol, and by some Babi Alu. It is not impossible, that, as both animals have white bands, the names may have been confounded by people little in the habit of seeing either, and deriving their information solely from report. In a country like Sumatra, where the inhabitants, in a great measure shut out from general communication, are divided into an infinity of tribes, speaking different dialects, a perfect consistency or uniformity of nomenclature

ture cannot be expected, and it is not always easy to reconcile the synonymy.

TAPIRUS Malayanus.

The first notice that I received of the existence of this animal was in the year 1805; a living specimen having been sent to Sir George Leith, when Lieutenant-Governor of Penang: it was afterwards observed by Major Farquhar in the vicinity of Malacca. A drawing and description of it was communicated by him to the Asiatic Society in 1816, and a living subject was afterwards sent to the Menagerie at Barrackpore from Bencoolen. At this latter place the specimens contained in the present collection have been procured.

It is known by different names in different parts of the country. By the people of Limun it is called Saladang, سلادڠ by those of the interior of Manna, Gindol, گندول in the interior of Bencoolen, Babi Alu; and at Malacca, Tennu.

Little can be added to the original description of Major Farquhar, the substance of which is as follows:

The Malay Tapir resembles in form the American, and has a similar flexible proboscis. Its general appearance is heavy and massive, somewhat resembling the hog. It is particularly distinguished by its colour, the body having a broad defined belt or band of white, while the fore and hind parts are black. This band extends circularly round the body from behind the shoulders to the root of the tail, and contrasts strongly with the glossy black of the rest of the animal. The skin is thick and firm, thinly covered with short hair. There is no mane on the neck as in the American species. The head is black, and furnished with a proboscis of six or eight inches in length. The eyes are small. Ears roundish and bordered with white. The teeth are forty-two in number. In the upper jaw there are

are seven molars on each side, one small canine inserted exactly on the suture of the incisor-bone, and in front six incisors, the two outer of which are elongated into tusks. In the under jaw there are but six molars, the canines are large, and the number of incisors, the two outer of which are the smallest, is the same as in the upper jaw. There is a vacant space of about two inches between the molars and canines in each jaw. The tail is very short, and almost destitute of hair. The legs are short and stout; the fore-feet furnished with four toes; the hind-feet with three.

These animals are large, particularly in the body, which is equal to that of the Buffalo. It may be interesting to give the exact dimensions of two, one a male, described by Major Farquhar; the other a female, killed at Bencoolen. It is remarkable that all the females that have been procured have been considerably larger than the males.

	Male.		Female.	
	Ft.	Ins.	Ft.	Ins.
Extreme length from the nose to the tail, measured along the back	6	10½	8	1
Circumference of the body	6	0	6	3
Height of the shoulder	3	2	3	5
Ditto at the haunch	3	4	3	9

In a subsequent communication to the Asiatic Society, Major Farquhar gave an account of a very young Tapir which he had alive in his house. It appears that until the age of four months it is black, and beautifully marked with spots and stripes of a fawn colour above, and white below. After that period it began to change colour, the spots disappeared, and at the age of six months it had become of the usual colour of the adult. Major Farquhar says that he found this animal of a very mild and gentle disposition, that it became as tame and familiar as a dog,

fed

fed indiscriminately on all kinds of vegetables, and was very fond of attending at table to receive bread, cakes, or the like. The living specimen sent from Bencoolen to Bengal was young, and became very tractable. It was allowed to roam occasionally in the park at Barrackpore, and the man who had the charge of it informed me that it frequently entered the ponds, and appeared to walk along the bottom under the water, and not to make any attempt to swim.

The flesh is eaten by the natives of Sumatra.

SUS Scrofa.

Babi. بابي

The Wild Hog of Sumatra offers nothing peculiar.

HALICORA Dugong.

Duyong of the Malays. دويوغ

Of this singular and interesting animal I have already sent an account to England. The specimen which accompanied it was procured at Singapore, and presented to me by the Sultan. They are occasionally met with in the bay of Tappanuli on the west coast of Sumatra.

Since writing the above a new and very singular animal has been brought to me, which agrees with *Viverra* in the number of incisors, but differs in their proportions and disposition. The naked rat-like tail is also peculiar. If it be considered as a *Viverra*, the specific name of *gymnura* would be appropriate.

It is above a foot in length from the nose to the root of the tail, which

which is ten inches more. The body, legs, and first half of the tail are black. The head and neck to the shoulders are white. There is a black stripe above the eyes, and there are black hairs intermixed with the white on the top of the head between the ears. The tail is nearly naked, somewhat scaly, black to the middle, and white from thence to the tip. The body is covered with two sorts of hair, one short, silky and dense, forming a fine coat of fur; the other longer and coarser. The muzzle is elongated, and the snout projects nearly an inch beyond the lower jaw. The nostrils are prominent, and have their margins convoluted. There are in the upper jaw six incisors, the first two largest and remote from each other, the last pair very small; two canines about the same length as the first incisors, and six molars on each side, the first of which is small and has two points, the second is larger and has one point. The fourth and fifth molars are the largest, and are marked with four tubercles; while the last is imperfect, and has only three. In the lower jaw there are six incisors, of which the last pair is the smallest; the others nearly equal, and with a space between the first two as in the upper jaw. There are two long canines, and six molars, similar to those above. Tongue large and soft. Eyes small. Ears rounded, erect and bare. Whiskers long, some of the hairs white, some black. Legs and feet scantily covered with short hair, the fore-ones thick and muscular. Feet five-toed, with compressed, curved, sharp claws. The animal emits a strong musky smell.

An animal was brought to Major Farquhar some years ago from the woods in the interior of Malacca, under the name of Tikus Ambang bulan, which appears to be the same as the above.

In concluding this part of the catalogue, it may be proper to observe that I have information from the natives, of several additional Mammalia existing in Sumatra, but which I have not felt myself justified in noticing until that information is more full and complete. The King of Acheen assures me that there is an animal called Jumbing nearly the size and make of a horse, with two unequal horns, to be found in the eastern part of his dominions; and several smaller animals, which appear to be yet undescribed, are mentioned by the natives as existing in the forests of the interior of Bencoolen, which I hope in time to procure.

THE

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TRANS-

XVIII. *Second Part of the Descriptive Catalogue of a Zoological Collection made in the Island of Sumatra and its vicinity. By Sir Thomas Stamford Raffles, Knt., F.R.S.*

Read March 20, 1821.

A V E S.

VULTUR.

Vultures are rare on the west coast of Sumatra, but are occasionally seen on the Malay peninsula and at Penang.

FALCO.

Halang or Lang of the Malays. هلڠ

In this genus the species are so numerous and so liable to variation, that it is not easy to determine them with certainty without ampler means of reference than are obtainable in India. Those contained in this collection appear reducible under the following species.

1. FALCO Ossifragus, *Linn.* Var.

Lang Boomboon. هلڠ بمبون

2. FALCO dimidiatus.

Lang Laut, or Sea Eagle. هلڠ لاوت

Resembles the preceding in size and general appearance, but has the head, under part of the body, and end of the tail white, with bill and cere blue. Both species live chiefly on fish.

3. FALCO Bacha.

This species, described by Le Vaillant, has been found in Sumatra both at Bencoolen and at Acheen.

4. FALCO Pondicerianus, *Gmel.*

Lang Bondol. هلڠ بندول

This species of Kite is frequent throughout India and the eastern islands, and is very useful in devouring carrion. It is commonly called in India the Bramini Kite.

5. FALCO communis, *Gmel.* Var.

Rajawali of the Malays. رجولي

Sikap Lang of the Sumatrans. سيکڤ هلڠ

Laki Angin of the Passummahs. لاکي اڠن

This Falcon is in high estimation among the Malays, who consider it as the prince of birds, and have frequent allusions to it in their poetry.

6. FALCO Nisus, *Linn.*

Sikap Balam. سيکڤ بالم

Of this there are several varieties. The smallest kinds are called Sikap belalang, or Mangkas.

7. FALCO caligatus.

Lang Tambikar. هلڠ تمبيکر

Is a large, and perhaps a new species.

It is above two feet in length, and more than three feet across the wings. Bill and claws blueish-black; cere blueish. Legs covered with short feathers down to the toes, which are pale yellow.

yellow. The colour on the back and wings is fulvous brown, the edges of the feathers being lighter coloured, and the wing-feathers having darker transverse bands. The lower parts are white, with a lanceolate brown spot in the middle of each feather; on the abdomen and thighs these become transverse stripes. The bill is straight at the base, curved at the point, and the upper mandible has an obtuse dent in the middle. The feathers on the head rise into a kind of crest behind, and are lighter coloured than those of the body. The cheeks are whitish, with brown spots. The rectrices are brown, with several dark transverse bands. The wings are shorter than the tail, and their fourth feather is the longest.

STRIX.

Burong Hantoo, or Pongo. بورغ هنتو ڤڠو

Also called Toohook توهوق by the Sumatrans.

Hantoo and Pongo are both names given by the Malays to certain imaginary beings of evil omen, or in one word, hobgoblins. Owls are also called birds of the moon; and are fabled to be in love with that planet, because they are said to be particularly vociferous just before she appears, and to become silent the moment she rises above the horizon, as if they had then attained the object of their wishes. There are three species in the collection.

1. STRIX Sumatrana.

The first and largest resembles in colour the *S. nyctea*, or Snowy Owl, but is a horned species.

It is about fourteen inches in length; its plumage white, and each feather marked with transverse stripes of brown, which are fainter below than on the back. The great wing-feathers are black; the secondary deep brown, with yellowish bands

 mixed

mixed with white, particularly on the inner side, and at the points. The horns are not very remarkable. The eyes are surrounded with a well-marked circle of white, stiff, bristly feathers; the eyelids are fringed with black ones. The ears are oval and small. The bill is yellow, curved, and surrounded at the base by bristles, which are directed forwards, and are as long as the bill; those on the upper mandible black, on the lower white. The legs are feathered to the toes. Tail rather short, with white bands and tips. Wings equal in length to the tail.

This species agrees generally in character with the *Strix Bubo*, but has the colour of *S. nyctea.*

2. SRIX Lempiji*.

The second species resembles the *S. Scops* of Europe, being of the same size, but differs in some degree in its colours, which are a mixture of brown and buff, darker on the back and lighter on the breast, which is moreover marked with narrow arrow-shaped spots of black.

3. STRIX scutulata.

The third is a hornless species, about ten inches in length, brown above, lighter and variegated with white below; the tail with black bands; legs feathered to the toes; yellow irids; and wings shorter than the tail.

PSITTACUS.

The species of this genus are much less numerous in Sumatra and the Malay peninsula than in the more eastern islands, particularly the Moluccas. The following are natives of the former countries.

* *S. Lempiji.* Dr. Horsfield, page 140 of this volume.

1. PSIT-

1. PSITTACUS ORNATUS, *Linn.*

Is found on the Malay peninsula.

2. PSITTACUS ERUBESCENS, *Shaw.*

BURONG BAYAU. بورڠ بايو

This species is not unfrequent in Sumatra. The specimens in the collection are from the vicinity of Bencoolen. It is this species that figures in the fables and poetry of the Malays, in which it is represented to be endowed with a supernatural degree of intelligence.

3. PSITTACUS GALGULUS, *Linn.*

SERINDIT. سريندیت

Found in the interior of Bencoolen.

4. PSITTACUS MALACCENSIS, *Lath.*

TANOW, or PIALLING. تانو نيالیڠ

5. PSITTACUS SUMATRANUS.

KÉKÉ. کیکي

This species is about twelve or fourteen inches in length, entirely green, and with a moderately long even tail. The bill is light flesh-coloured; the feet blueish or lead-coloured. A naked blackish space surrounds the eye, which has the irids white. The feathers on the neck have a yellowish tinge, and those of the rump are blueish. On the rest of the body the green is pretty uniform, but is brightest on the head. The inside of the wings is blackish.

Besides

Besides these, there are numerous species met with in captivity, which have been brought from the more eastern islands, such as the *Psittacus Gigas*, *cristatus*, *sulphureus*, *Dominicella*, &c., which it is unnecessary to particularize, as they are for the most part well known. One of the most beautiful of these is the *P. cyanogaster*: an individual of this species has long been a familiar inmate of my house, and is remarkable for its extreme degree of familiarity and domestication. It is always left at perfect liberty, and associates freely with all the other animals in the house. It attends regularly at table, courts the caresses of all, and shows an extraordinary degree of jealousy if the slightest attentions are paid to any other favourite.

TROGON Kasumba.

Burong Kasumba. بورغ كسمبا

Appears to resemble *T. fasciatus*.

The bill is strongly notched near the point, not serrate, as in the rest of the genus. This beautiful species is about ten inches in length, and appears to vary somewhat in colour according to age and sex. In the larger specimens the colours are less bright. The back is there of a yellowish-brown; the lower parts yellowish mixed with red. The head and neck are covered with filiform feathers, partly black, partly grey. A whitish band divides it from the breast. The wing-coverts are black, with white fasciæ, which are wider and greyish on the larger coverts. The remiges are black, with a narrow edging of white on some of the feathers. The two upper tail-feathers are fawn-coloured tipped with black; the next black, sometimes tipped with brown; and the lower ones partly white. The bill is dark blue, approaching to black, short, broad at the base, with a prominent arched keel above, strongly

strongly notched near the point. The lower mandible is incurved at the edges, turned upwards at the point, and notched. The nostrils are oval, situated near the base of the bill, and partly covered by the feathers; above each is a fascicle of strong black bristles: there is another fascicle on each side of the lower mandible, and a single one on the chin. The tarsi are short, and covered with blackish feathers tipped with reddish-white, which radiate in such a manner as to form a kind of ring or circle above the toes. The feet are formed for climbing. In young and smaller specimens the colours are much more brilliant; the head is of a velvet-black; the neck, breast, abdomen and rump are bright red, and the back is ferruginous. The whole of the wing-coverts are finely and delicately striated with white. The arrangement of the colours of the tail is the same as above described. The bill appears to be rather more depressed. In both old and young there is a naked space of the same blue colour as the bill behind the lower mandible, and another above the eyes. The irids are brownish-red. The skin is thin, and the feathers weakly implanted in it, so as easily to be pulled out; and hence it is not easy to prepare good specimens.

BUCCO.

1. BUCCO Philippensis, *Linn.*

Chanda. چندا

This species does not appear to be different from the *B. Indicus*; and the latter name would probably be preferable, as being more general.

It is found in Sumatra.

2. BUCCO

2. BUCCO Lathami, *Gmel.*

Ampis. امفيس

Is about six inches in length. Bill more compressed and arched than in the other species of the genus, and wanting the bristles at the base; almost black in the male, but yellowish in the female. The legs are red, but become yellowish by drying.

Found at Singapore, and also in the interior of Sumatra.

3. BUCCO versicolor.

Takoo. تاكو

Is a large species found at Singapore and in Sumatra.

About $10\frac{1}{2}$ inches in length. General colour green; dark above and lighter below. Crown of the head red. Throat blue; sides of the head black, separated from the red on the top by a blue stripe. There are besides a spot of red behind the eyes, a second larger of orange-yellow on the side of the neck, and a third of red on the side of the breast. These colours are liable to vary, and some of the spots are often entirely wanting. Bill black, with the bristles at the base; the upper mandible curved a little outwards near the base. Wings and tail green above and brown beneath. Legs blackish-blue. Behind the upper articulation of the tarsus are sometimes found a few hard sharp tubercles, which may possibly assist the bird in climbing. Only males of this species have been found, and among them scarcely any two were perfectly alike; in some the breast was entirely black or grey; in others marked with a white spot; in some the crown of the head is grey, and the lateral red spot is frequently wanting.

4. BUCCO

4. BUCCO AUSTRALIS*.

Is about the size of the *Bucco Philippensis*, or $5\frac{1}{2}$ inches in length. The female only has been yet met with, and is of a green colour, somewhat lighter below. The throat is a greenish-blue. There are two red spots behind the eye, one rather above it, and the other larger below it. There is sometimes a black patch on the breast. Legs black; in which it differs from the *B. Philippensis*, whose legs are red.

CUCULUS.

1. CUCULUS FLAVUS, *Gmel.*

In the present specimen (a female) the tail is barred with brownish-yellow instead of white, as commonly described. The grey of the head extends to the breast. The nostrils are perfectly round and tubular, their edge forming a prominent ring.

Found at Pulo Penang.

2. CUCULUS TOLU†.

KRADOK, or BOOBOOT. كرادق بوبوت

The colours of this bird vary considerably at different ages. When young it is of a greenish-black, with rufous wings. As it becomes older, the belly becomes whiter, the shafts of the feathers on the head and back acquire a light colour, and the upper feathers of the tail become barred with grey. It lives on insects, is chiefly observed on the ground, and has a weak flight.

* *Bucco australis.* Horsfield, p. 181. † *Centropus lepidus.* Ibid. p. 180.

3. CUCULUS Malayanus.

This species has some affinity to the *C. lucidus.*

It is about seven inches in length; brown above, with a greenish gloss, particularly on the scapulars. The whole under parts are transversely barred with white and brown undulations. The wings are long, extending to about the middle of the tail; the coverts edged with ferruginous. The tail consists of ten feathers, of which the upper are greenish-brown, and the lower barred with brown, black and white. The bill is somewhat compressed at the base, and the nostrils are prominent. There is a row of white dots above the eyes.

Native of the Malay peninsula.

4. CUCULUS Bubutus*.

This is one of the largest of the genus, being not much less than two feet in length. The whole body is of a deep blue colour with a greenish gloss. The wings are of a bright-red brown. The bill is black, compressed and arched. The nostrils narrow and oblique. The eyes are surrounded by a circle of black bristles. The irids are crimson. The tail, which is blueish-black, without spots or bands, is cuneated, and consists of ten feathers. The claw of the thumb-toe is longer than that of the others, but not proportionally so long as that of the *C. Tolu.*

It is a native of the forests of Sumatra, and feeds principally upon grasshoppers.

* *Centropus Bubutus.* Horsfield, p. 180.

5. CUCULUS

5. CUCULUS MELANOGNATHUS*.

INGGANG BALUKAR. انڠڬڠ بلوکر

It is about 17 inches long. Back and wings blueish-green with a metallic gloss. The first half of the tail is of the same colour, but the extremity is of a deep sanguine brown. The throat, breast and uropygium are also brown; the abdomen is blackish. The head is covered with stiff bristly feathers, of a greyish-black. The bill is of a glaucous-green colour, compressed, arched, and somewhat hooked at the point. The lower mandible is red, and similarly curved. The nostrils are round, situated near the edge of the upper mandible, and surrounded by a fascicle of stiff erect bristles. A large naked red space surrounds the eyes, and extends forward to the bill. The irids are black. The feet are lead-coloured.

It lives on insects, and not, as has been stated, on fruits. It is found on the hills of Sumatra and the neighbouring islands; but is not easily procured, as it commonly perches on the summits of the highest trees.

6. CUCULUS SUMATRANUS.

SEPANDO of the Sumatrans. سيفندوق

Is a smaller species, nearly related to the preceding.

It has the same yellowish-green curved bill and naked red space round the eyes, and the same colours on the back and wings. The nostrils are similarly situated, but are not so round, their opening being somewhat elongated upwards. The length of this is about 15 inches, and the tail is nearly twice the length of the body. The head, throat, and breast are of a uniform

* *Phænicophæus melanognathus.* Horsfield, p. 178.

dark grey. The tail, like the back and wings, is of a metallic blueish-green, and each feather is tipped with white. The abdomen is nearly black, shading into rufous towards the breast and vent.

Inhabits Sumatra and the adjacent islands, and lives on insects. It appears to resemble very nearly the *C. pyrocephalus.*

7. CUCULUS chlorophæus.

Booboot. بوبوت

The characters of this species are in some degree intermediate between the true Cuckows and those of the two preceding, which belong to the division called after Le Vaillant *Malcoha.*

The eyes are surrounded by a naked space of the same green colour as the bill, which however is nearly straight, strong, and hooked at the point. The bird is about 13 inches in length, and the tail is longer than the body. The general colour is fawn or ferruginous, lighter on the under-parts, and passing into black at the extremity of the wing-feathers. The abdomen is blackish. The tail is dark coloured, regularly marked with numerous bands of black, while the extremity of each feather is white. The legs are blueish.

This species inhabits the forests of Sumatra, but is not common. It feeds on insects, like the rest of the genus.

PICUS. Tukki. تكي

1. PICUS affinis.

Tukki Bawang. تكي باواغ

Is related to the *Picus viridis,* differing, however, in several particulars.

This

This species is about 10 or 11 inches in length, dusky green above, with a shade of yellow on the lower part of the back; cinereous or slightly ferruginous below, mixed with brown on the abdomen. Quill-feathers brown spotted with white. Tail-feathers brown, pointed as usual in this genus; the two uppermost with a few lighter-coloured spots along their inner margin. A grey patch encircles the eyes, bounded below by a black stripe mixed with white spots, which runs from behind the lower mandible.

In the male the crown of the head is red, often variegated with black, each feather being black at the base and red at the tip; in the female it is entirely black. The bill and feet are blackish-blue.

2. PICUS PUNICEUS*.

TUKKI BAJUKARAP, or BELATU. تكي باجوكارب بلاتو

This species is about nine inches in length, of a dusky green above, shading into yellow on the lower part of the back; dark brown below, with lighter-coloured undulations and a slight green tinge on the sides of the throat and abdomen. It is remarkable in having the wings of the same crimson-red as the crown of the head. The two outer wing-feathers and the tips of the others are brown; and the inside of the wings is of the same colour, spotted with white. The tail-feathers are black. The bill is blueish-black, and the legs are cinereous.

3. PICUS BADIUS.

TUKKI KALABU. تكي كلابو

This appears to have a considerable resemblance to the *P. undatus* and *P. rufus* of Cayenne.

* *Picus puniceus.* Horsfield, p. 176.

It

It is little more than eight inches in length, and is throughout of a ferruginous-brown colour waved with black, scarcely varying in intensity on any part of the body. Below the eyes are several small red spots or dots. The bill and legs are black.

4. PICUS tristis*.

Tukki boreh. تكي بوريه

Is only six inches in length; black, with transverse white undulations, which are numerous, and fine on the head and breast; larger and fewer on the back, abdomen, wings and tail. The rump is whitish, and there is a red stripe behind the lower mandible. The bill is black, and the legs blueish. The female has more of a brown tinge, with finer and more numerous undulations, which become scarcely perceptible on the head.

5. PICUS minor. Var. Tukki lilit. تكي ليليت

6. PICUS Tiga†.

Tukki besar, or *T. rufa.* تكي بسر

This is a very singular three-toed species of *Picus*, remarkable for wanting the thumb-toe, and differing therein from the *Picus tridactyla*, which is deprived of the outer toe.

It is above ten inches in length, orange-coloured on the back and wings, red on the rump, and variegated with white and black below. The outer quill-feathers and the tail are brownish-black. The nape of the neck is black, the sides white, with a black stripe from behind the eyes. The male has a red crest. In the female the head is black, with white spots,

* *Picus tristis.* Horsfield, p. 177. † *Picus Tiga.* Ibid.

and

and is not crested. The bill is blueish-black, and the legs are blueish.

BUCEROS.

Of this genus, three species are abundant in Sumatra and the adjacent countries.

1. BUCEROS Rhinoceros, *Linn.*

Inggang Danto of the Malays. اڠکڠ دنت

The female differs from the male in being rather smaller, the horn being more recurved, and in having the iris white, while that of the male is red.

2. BUCEROS cavatus.

Inggang papan. اڠکڠ ڤاڤن

Burong Oondan (Malay). بوروڠ اوندن

3. BUCEROS Monoceros.

Kiki at Malacca. کيکي

BUCEROS Malabaricus, *Gmel.*

Angka Angka. اڠکا٢ of the Sumatrans.

All these species vary considerably at different ages in the colours of the plumage, and the form of the prominences on the bill. They inhabit the forests, and live principally on wild fruits. They are occasionally kept tame, and the last in particular is easily domesticated.

4. BUCEROS galeatus, *Gmel.*

Besides these, I have recently procured heads of another species, which is probably the *B. galeatus,* differing from most of the

the genus in the comparative shortness and the greater solidity and strength of the bill. The prominence, which is somewhat squarish, is rounded at top and truncated in front.

In Major Farquhar's collection of drawings, made at Malacca, is one of this species taken from a living specimen, which appears to differ in some respects from the description of that contained in the British Museum, particularly in having the two middle feathers of the tail more than twice as long as the rest. They are all white, and crossed by a black band near the tips. On the throat below the bill is a loose, naked, red skin. The naked space round the eyes and the legs are also red. The iris is orange-coloured. The head is black, with a spot of reddish-brown on the sides behind each eye.

This species is called Toko توكوق ; and Burong Gading بورڠ ݢدیڠ in Sumatra; and Tibbang Mantooa تبڠ منتوا at Malacca.

5. BUCEROS Malayanus.

In a paper (already quoted) sent by Major Farquhar to the Asiatic Society, and accompanied by drawings and specimens, is an account of several species of Hornbills found in the neighbourhood of Malacca. Among these is a species very nearly resembling the *B. coronatus* of Africa.

It is about the size of a Raven, and is particularly distinguished by a white stripe extending from behind each eye to the back of the neck, and so encircling the head. The bill is yellowish-white, and surmounted by a moderate sized crest, which slopes gradually in front to the curvature of the bill. The whole of the body is black, with the exception of the stripe above mentioned, and the tips of the three outer tail-feathers on each side, which are also white; the middle ones are black to the ends. The legs are of a greenish colour.

6. BUCEROS

6. BUCEROS Pusaran.

The Sumatrans distinguish another species by the name of Pusaran فوسارن of which I have a living specimen, as yet too young to allow of being accurately distinguished, the horn being only partially developed. On its throat is a bag capable of being distended with air, of a bright yellow colour.

ALCEDO.

Of this genus there are six species in the collection.

1. ALCEDO leucocephala, *Gmel.*

Bang Kako. بڠ كاكو

The belly is generally of a fawn-colour.

2. ALCEDO atricapilla, *Gmel.*

Burong Udang. بورڠ اودڠ

In this species the wings are crossed at the middle by a band of light whitish-blue, which is only observable when the wings are expanded; below them is a similar band of white.

3. ALCEDO chlorocephala, *Gmel.*

Bang Kako. بڠ كاكو

4. ALCEDO ispida. Var. Bengalensis.

Binti. بنتي

5. ALCEDO cyanocephala *Shaw.*

Binti.

6. ALCEDO tridactyla, *Linn.*

Binti Abang. بنتي ابڠ

 MEROPS.

MEROPS.

1. MEROPS Sumatranus.

The upper parts of the head and neck, and the back between the shoulders, are of a beautiful chesnut colour. The posterior part of the back, the wings above, and the belly, are pure emerald-green. The plumes of the throat, as well as of the rump and vent, have a pale azure tint with a reflection of sea-green.

By the blue colour of the throat, as well as by the pure green of the back, wings and belly, it is sufficiently distinguished from the Senegal Bee-eater of Shaw, or the chesnut Bee-eater of Gmelin, which it resembles in the chesnut colour of the head, neck, and anterior portion of the back.

The extremities of the quill-feathers and the tail beneath are blackish-brown. The tail above is blue, with a diluted tint of sea-green; the two middle tail-feathers are greatly elongated, and towards the extremity the blueish tint is diluted: this is also the case with the vent-feathers. The wings underneath are ferruginous.

2. MEROPS Javanicus*.

Biri Biri بيري٢

In the specimens found here there are light blue streaks above the eyes, but I have not observed white lines. Both species are frequent in Sumatra and the eastern islands.

There are three birds belonging to the division of *Picæ gressoriæ*, which differ essentially from all hitherto described, and must constitute two new and distinct genera in that order.

* *Merops Javanicus.* Horsfield, p. 171.

The

The first, which I propose to name *Calyptomena* (*ἀ καλυπτω, velo*), is characterized as follows:

Bill depressed and broad at the base, hooked at the point, and almost concealed by the feathers of the head. Nostrils round. Tongue short. Feet gressorial.

CALYPTOMENA viridis.

Burong Tampo Pinang. بورڠ تمڤو ڤينڠ

This very singular and beautiful bird is about six inches and a half in length. Its colour is a brilliant green, like that of the Parrots. The head is rather large, and its feathers are directed forwards from each side in such a manner as nearly to conceal the bill, giving the face a very peculiar appearance. A little above and before the eyes the feathers are of a deep velvet-black at their base, and only tipped with green; and there is a similar spot of black immediately over the ears. The wings are scarcely longer than the body, green, but crossed on the coverts by three velvet black bands; the primary feathers, as well as the whole under-side of the wings, are dusky approaching to black, with the exception of the outer margins of some, which are edged with green. The tail is short, rounded, composed of ten feathers, which are green above and blueish-black below. The whole of the under-parts are green. This colour is lightest on the sides of the neck and round the eyes. The bill is short, wide, much depressed at the base, deeply cleft, and hooked at the point. Nostrils oval at the base of the bill, and concealed by the filiform feathers that project over them. The eyes are rather large; the irids blueish. Legs blueish-black. A few feathers come down over the upper part of the tarsi. Feet gressorial;

 outer

outer toe not much shorter than the middle one, with which it is united as far as the last joint.

The stomach of this bird contained nothing but vegetable substances, chiefly wild grains. It is found in the retired parts of the forests of Singapore and of the interior of Sumatra; and being of the colour of the leaves, and perching on the higher branches of the trees, it is not easily procurable. The female does not differ in appearance from the male.

The second genus*, also belonging to the order of *Picæ gressoriæ*, is characterized by a very large, thick, strong bill, wide and rounded at the base, hooked and slightly notched at the point. The edge of the lower mandible is incurved under the upper. Nostrils not covered. Feet gressorial.

Of this genus there are two species.

1. EURYLAIMUS LEMNISCATUS.

Burong Palano, or Tampalano. ڤلانو تمڤلانو

It is about eight inches in length, of a thick, stout and rather heavy make. Above it is of a full black colour, beneath dark red. The head, chin and breast are black; the throat is encircled by a broad red band of dense, stiff, filiform feathers, which extends upwards on each side to behind the eyes. The lower part of the breast, abdomen, rump and upper tail-coverts are dark red. The scapular feathers, which are long and very acute, are of a pure white colour, contrasting strongly with the deep black of the back and wings. There is an orange line at the upper angle and edge of the wing, and a white spot on its inside. The tail is black, three inches in length, and cuneate. On each side of the bill are two or three

* The genus *Eurylaimus* of Horsfield, p. 170

stiff

stiff bristles, which turn upwards. The bill is of a bright-blue colour, large, thick and strong, wide at the base, arched but scarcely carinate above, hooked at the point, where it forms a kind of rounded unguis, behind which is a slight notch. The lower mandible is scarcely shorter than the upper. The nostrils are narrow and horizontal, situated about the middle of the bill, and a furrow is continued both backward and forwards from them. Irids green. The feathers on the thighs are blackish; the legs are blue. The tarsi are rather long; the outer toe is connected to the middle one beyond the middle of the second phalanx. The claws are strong and hooked.

This species is found in the interior of Sumatra, frequenting the banks of rivers and lakes, and feeding on insects and worms. It builds its nest pendent from the branch of a tree or bush which overhangs the water, and is said to lay only two eggs.

2. EURYLAIMUS OCHROMALUS.

The second species is considerably smaller, being scarcely six inches in length. The head and chin are black, the back and wings black variegated with bright yellow. The scapulars are less distinct than in the preceding, and chiefly yellow. A white band surrounds the throat, divided from the breast by a similar one of black, which is incomplete in the female. The breast and abdomen have a light vinous-red tint; the uropygium is bright yellow. The tail is one inch and a half in length, composed of ten feathers, which are black, with a round white spot near the extremity of each. There are no bristles at the base of the bill, which is blue, like the preceding, but is more depressed at the base. It is somewhat arched, hooked, and notched at the point. In this, as in the former,

former, the upper mandible overlaps the lower, whose edges are incurved for the purpose. In this species the nostrils are round, and situated near the base of the bill. The feathers on the thighs are blackish, the legs reddish; the tarsi rather long; the outer toe united to the middle one as far as the last joint.

Found at Singapore and in the interior of Sumatra. They are seen in small flocks, and feed on insects, like the preceding.

CERTHIA.

Of this numerous and beautiful genus there are several species in the collection; but it is not easy, without extensive reference to figures, to determine them all. They are known to the Malays by the general name of Chechap چچڤ or the Suckers, as they are said to suck the juices of flowers.

1. CERTHIA SPERATA, *Linn.*

CHIRICHIT, CHECHAP, or SIAP. چريچيت چچڤ سيڤ

This is probably a variety of the *C. Sperata*, but has also a considerable resemblance to the *C. Brasiliana*, the sides and back of the neck being of a velvet-black, and the tail having a tinge of blue. The head is of the most brilliant golden-green, the throat of a splendid purple, the breast and abdomen dusky-red, and the shoulders and tail-coverts black, with a changeable shade of green and purple.

2. CERTHIA ERYTHRONOTOS, *Lath.*

SIKRAT, or SIPA PUTRI. سيكرت سڤا ڤتري

3. CERTHIA

3. CERTHIA Siparaja.

Sipa Raja. سڤا راج

This species has a blue patch on the forehead, and a stripe of the same colour on each side of the neck. The back of the head, neck, and upper part of the back are dark-red; the breast of a lighter red; the abdomen, wings, and middle tail-feathers brown, while the tail-coverts and outer tail-feathers are blue.

4. CERTHIA Javanica*.

This appears to have a considerable resemblance to the *Certhia lepida*. The head and neck are blue, with a gloss of green and gold, the tail-coverts and some of the tail-feathers bright blue, the wings brown, with a tinge of ferruginous red on some of the lesser coverts. Throat ferruginous, with bright-blue stripes along the sides, which almost meet on the breast. Abdomen and breast yellow. Sometimes the head and neck have more of a green colour.

5. CERTHIA longirostra†, *Latham.*

Siap Jantung. سيڤ جنتڠ

This is larger than any of the preceding, and has a bill an inch and a half in length. Colour olive-green above, greenish-yellow beneath; a yellow patch below the eyes.

In all the *Certhiæ* the colours of the females are duller than those of the males.

* *Nectarinia Javanica.* Horsfield, p. 167.
† *Cinnyris longirostra.* Ibid. p. 167.

PARADISEA.

BURONG DEWATTA. بورڠ ديوات

All the species of this genus are natives of the Papuan archipelago, whence they are occasionally brought alive. I have had in my possession living individuals of the common species, the *P. apoda*. They were fed on grasshoppers, and lived with me several months. I have specimens of the *P. sanguinea* Viell., whose description is very exact, as is also the figure, with the exception of the wings, which are represented too short. They are, in fact, nearly as long as the true tail. In the specimen from which Viellot's figure was taken, the wings were wanting; which will account for this little inaccuracy.

CORVUS.

CORVUS CORAX, *Linn.*

GAGAH of the Malays. ڬاڬق

This is not uncommon in the interior, but is scarcely ever seen on the coast near Bencoolen.

The other species belong to the short-tailed division, which has been separated from the true *Corvi*, under the name of *Myiothera*.

1. MYIOTHERA BRACHYURA, *Illig.*

CORVUS BRACHYURUS, *Linn.*

2. MYIOTHERA AFFINIS*.

SINTAR. سينتر

TURDUS CYANURUS *Lath.*

It differs in having the pectoral band and transverse lines black.

* *Myiothera affinis.* Horsfield, p. 154.

3. MYIOTHERA

3. MYIOTHERA CÆRULEA.

It is much larger than the former species, being above two inches in length, and seven or eight in height. It is of a thick heavy form, with a very short tail. The whole of the back, tail, and secondary wing-feathers are light-blue. The under-parts are brown, cinereous on the throat, with a greenish tinge on the breast, and a ferruginous one on the abdomen. A black collar surrounds the neck immediately above the shoulders. The crown of the head and back of the neck are also black, and a stripe of the same colour runs along its sides from behind each eye. The quill-feathers are black, with blueish tips. Bill blackish, strong, rather straight, curved at the point with a scarcely perceptible notch. Irids reddish. Tarse high, and of a dark colour. Claw of the hind-toe longer than the others.

The female differs so considerably from the male, that it might be taken for a different species. It is somewhat smaller, of a reddish-brown or chesnut-colour above, with blue only on the tail and tail-coverts. Below it is of the same cinereous-brown as the male, and has the same black collar round the neck, and lines behind the eyes; but the crown of the head and neck have only transverse black lines on a ferruginous ground.

Here may be mentioned a bird that appears to differ very little from the *Corvus Papuensis*, now referred by Cuvier to the genus *Lanius*. It is very uniformly of a blueish-grey colour, with the exception of the wing- and tail-feathers, which are black. In the male the breast is often marked with transverse undulations of a dark colour*.

* This bird appears to belong to the genus *Ceblephyris* of Cuvier.

CORACIAS.

In this genus, the most remarkable is the beautiful Fairy Roller.

1. CORACIAS Puella, *Lath.*

Biang Kapoor. بياڠ كاڤور

Nothing can surpass the richness of the colours which distinguish the male of this species . they far exceed what any painting can convey. The crown of the head, back, smaller wing-coverts, and upper and lower tail-coverts are of the most resplendent smalt-blue, while every other part is of the finest velvet-black. The bird is above nine inches in length. The bill black, strong, somewhat curved, compressed, strongly carinate above, and notched near the point; surrounded with short bristles at the base. Nostrils roundish, and partially covered by the feathers. Irids crimson. Legs short and black.

In the female there is no trace of the brilliant colours of the male; and the whole body, with the exception of the wing- and some of the tail-feathers, is of a dull blue.

Adverting to the form of the bill, compressed, carinate and notched, it seems doubtful whether this bird be truly a species of *Coracias*; and it is remarkable, that the Malays class it with the Biang, a species of *Lanius*.

It is found in the interior of Sumatra and the adjacent islands, and lives on wild grains and fruits.

2. CORACIAS orientalis, *Linn.*

Tiong Batu. تيوڠ باتو

This bird is classed by the Malays with the *Gracula religiosa*; and the affinity of the latter to the genus *Coracias* seems recently to have been noticed in Europe.

3. CORACIAS

3. CORACIAS Sumatranus.

This is a singular species of *Coracias*, which appears to be undescribed. It was found in the interior of Sumatra, and is rather less than the *C. orientalis*.

The bill is red, and unusually large and wide, depressed at the base, arched, hooked at the point and notched. There is a naked space round the eyes, which is also red. It is black above and on the abdomen, with orange-coloured throat and scapulars. The quill-feathers are black, with a white band near the middle; tail black. The nostrils are round, situated near the commencement of the feathers, but not covered by them. Irids brown. Legs blackish.

GRACULA.

GRACULA religiosa, *Linn.*

Tiong. تيوڠ

A variety of this is sometimes found with whitish spots on different parts of the body.

It is remarkable, that the smallest quantity of salt occasions the sudden death of these birds. The natives also affirm that the mere sight of blood is equally fatal to them.

ORIOLUS.

ORIOLUS Chinensis, *Linn.*

Tiong alou, or Punting alou. تيوڠ الو. ڤنتيڠ الو

LANIUS.

The limits of this genus not being accurately defined, it is difficult in many instances to determine the true place of some of the species, particularly where they graduate into the genus

Turdus. A more accurate comparison in Europe can only determine this point; and in the mean time the following notice of the specimens in the collection may be sufficient for general reference.

1. LANIUS BENTET*.

BURONG PAPA, or TIUP API. بورغ ڤڤا تيڤ اڤي

Is perhaps a variety of the *Lanius Excubitor*, and is very common in the Malay countries and islands.

Bill very strong, and deeply notched; sides of the abdomen and lower part of the back tinged with ferruginous. Total length about nine inches; tail longer than the body.

2. LANIUS SUPERCILIOSUS, *Lath.*

Has the same strongly-notched beak as the preceding; and, like it, has also the point of the lower mandible turned upwards, which approximates them to those called *Vauga* by Buffon.

It is smaller than the former, being little more than seven inches in length, and is differently coloured. The upper parts are of a light fulvous or ferruginous-brown; the lower white, with a ferruginous shade towards the vent. The back and wings are sometimes mottled. The cheeks are marked with a broad black stripe, from the bill extending behind the eyes. Tail not so long as the body.

3. LANIUS GULARIS.

BAROU BAROU. بارو۲

Is about seven inches in length, and has the bill straighter, weaker, and less deeply notched than the two former. Colour above a cinereous or blueish-grey; beneath white, and

* *Lanius Bentet.* Horsfield, p. 144.

without

without ferruginous shade. Upper tail-coverts also white. A black stripe on the cheeks. Tail rather short, and without white. Wings extending to half the length of the tail.

4. LANIUS Striga*.

Burong Kapas kapas. بورغ كاڤس٢

Is a smaller and more delicately-formed bird than the last, six inches and a half in length, and has the tail proportionally longer. Bill considerably shorter, smaller, and slightly arched. The crown of the head and back are of a shining blueish-black. The wing-coverts are of the same colour, but edged and tipped with fine white. The remiges are black, with a very narrow line of white on their outer edges; the rectrices also black, with white tips. The rump and upper tail-coverts light blueish-grey; a shade of which colour also appears on the breast, while the throat and abdomen are white. The cheeks are white, crossed by a black stripe from the bill to the neck. In the female the colours have a browner tinge, are less defined, and the glossy black of the head and back is entirely wanting.

5. LANIUS divaricatus.

Beribba burong lilin. بربه بورغ ليلين

About seven inches in length; tail as long as the body, and forked; upper-feathers blackish; lower ones white. The bill is straight, hooked, and notched at the point. The colour above is grey, becoming brown on the wings; below white. A black stripe from the bill to the eyes.

Found at Singapore; but it is also known in Sumatra. The above is the description of the female.

* *Ceblephyris Striga.* Horsfield, p. 145.

6. LANIUS

6. LANIUS leucorhynchos, *Linn.*

Is seven inches and a half in length, and of a thick form and make. Bill light blue, darker at the point, strong, conic, somewhat arched, slightly notched, and scarcely hooked at the point. This species is peculiar in having the wings as long as the tail, and the first feather the longest. In most others it is the fourth feather which is the longest. The back, head and throat are of a greyish-brown; wing- and tail-feathers darker; breast, abdomen, rump, upper and lower tail-coverts white. Sides of the abdomen, under the wings, grey. Legs blackish.

7. LANIUS coronatus.

Burong J'ri. بورغ جريه

This is rather a large species, being upwards of ten inches in length. The feathers of the head rise into a kind of cone behind, and two of them are particularly elongated, being two inches in length, and form a crest, which is directed upwards and backwards. The bill is black, strong, straight, compressed, hooked and notched at the point, roundly carinate above. Nostrils large and roundish. Five or six strong bristles at the angle of the upper mandible. The colour of the bird is an uniform chesnut-brown, which becomes darker on the feathers of the tail and crest. There is a remarkable white spot on each side of the neck, immediately above the shoulder. Tail about four inches long; the wings extend nearly half its length. Legs blue; claws very strong.

8. LANIUS Malabaricus, *Lath.*

Burong Saweh. بورغ ساوي

9. LANIUS

9. LANIUS Insidiator*.

Biang, or Kalaloyang. بياڠ. كلالويڠ

Also Burong Kling. بورڠ كليڠ

Is allied to the *L. Malabaricus*, particularly by the form of its bill, which is regularly curved, slightly notched at the point, and not hooked, carinate and arched above, the curve of the lower mandible corresponding with that of the upper. The tail-feathers are nearly equal, none of them elongated as in the preceding. The whole bird is of a greenish-black, with a glossy metallic lustre, exhibiting according to the light changing shades of copper and green. The wings extend to about half the length of the tail, and have the three first feathers of about equal length. The bill and legs are black. The irids crimson.

The name of Burong Kling has been appropriated to this bird, because he is black and has red eyes; sure signs, it is said, of a bad character; and also because, when he settles on a tree, he generally leaves behind him the seed of the fig or other parasitic plant, which, growing, in time chokes and destroys the tree that nourished and protected it. Such is said to be the conduct of the men of Kling or Coromandel to those who receive them.

10. LANIUS musicus.

Moorai, or Moorai Kichou. موري كيچو

The Dial Bird, or *Turdus Mindanensis* of Gmelin and *Gracula saularis* of Linnæus; now with more propriety placed under *Lanius*.

It is one of the few singing-birds of India, and its note is pleasing. It is about eight inches and a half in length. In the

* *Turdus chalybeus.* Horsfield, p. 148.

female

female the feathers of the throat and breast are whitish mottled with grey and brown; and several of the wing-coverts are also white with reddish-brown shades. All the colours are duller than in the male.

11. LANIUS macrourus.

Turdus macrourus, *Gmel.*

Changchooi of the Sumatrans. چڠچوي

Nearly resembles the preceding, but has the abdomen of a bright ferruginous colour, while the rump and lower tail-feathers are white. The tail is considerably longer than the body; in the former it is of about equal length. This species also wants the white spot on the wings. It is about ten inches and a half in length, and has even a finer and sweeter note than the last. They are, in fact, the Nightingales of the eastern islands. Both kinds throw up and spread their tails in the manner of the Wagtails.

12. LANIUS*.

Is also nearly related to the two preceding, but is much smaller, being only five inches and a half in length. It is of the same shining blueish-black above, but is white on all the underparts. The throat and abdomen are pure white, while the breast is shaded with a light grey. The rump is white, as in the preceding species, but the whole of the tail-feathers are black. The tail is rather shorter than the body. In all these three species the bill is straight, somewhat compressed, curved at the point, and moderately notched.

The two first are frequent in all the Malay countries; the latter I have only very recently procured; but it is probably not uncommon.

* *Muscicapa obscura.* Horsfield, p. 146.

13. LANIUS

13. LANIUS RUFICEPS.

This species appears to resemble the *L. olivaceus.*

It is about nine inches long, with a compressed rather curved bill, scarcely notched at the point: the curve of the lower mandible corresponds to that of the upper. Head of a light ferruginous colour. The upper parts of a light olive-brown, the lower grey, almost white under the chin. Wings a little longer than the body, the outer edge of their quill-feathers yellowish-green. The tail is about four inches in length.

14. LANIUS XANTHOGASTER.

Is a small but beautiful species, about seven inches in length. Bill rather straight, compressed, hooked and notched at the point. Upper part of the body and head of an olive-grey; lower parts and sides of the forehead yellow. Wing-feathers black, edged with yellow. Upper tail-feathers black, lower yellow. A black line runs from the bill to the eyes, and there is a yellow spot on the wings. Bill and feet black. Nostrils covered with feathers.

TURDUS.

1. TURDUS COCHINCHINENSIS, *Gmel.*

BURONG DAUN. بورڠ داون

This appears to be the same bird as the *T. Malabaricus*, 125 Gmelin, which latter name ought therefore to be cancelled.

The female is of an uniform bright green, wanting the yellow and black of the male, but having the blue spots at the base of the bill. There is a variety of this bird found in Sumatra which is nearly twice as large, and exhibits less brilliancy of colour.

colour. It is nearly of an uniform green, with the exception of the blue spots behind the bill, and the black face and throat. It wants the tinge of the wing and tail feathers. In the female the chin and face are of a light yellow, not black as in the male.

2. TURDUS flammeus.

Muscicapa flammea, *Gmel.*

3. TURDUS analis*. Two varieties.

Biribba. بربه

The Biribba is said by the natives to elevate the feathers of the head when irritated.

4. TURDUS dispar†.

About seven inches and a half in length; yellowish-olive on the back, orange-coloured on the breast, shading into yellow to the vent. Head black; throat furnished with remarkable crimson feathers. Wing- and tail-feathers dark brown. Bill rather compressed, and very slightly notched. Irids red.

5. TURDUS melanocephalus.

Burong lilin. بورغ ليلين

Has considerable resemblance to the preceding, but is smaller, being six inches and a half in length. It is greenish-yellow on the back and breast, yellow on the abdomen and rump. Head of a glossy blueish-black. Tail-feathers yellow, with a black band near the end. Outer wing-feathers nearly black. Bill and legs black.

* *Turdus analis*. Horsfield, p. 147. † *Turdus dispar*. Ibid. p. 156.

6. TURDUS

6. TURDUS.

Head, shoulders and breast blueish-grey, passing into white on the abdomen; back and wings yellowish-green; vent-feathers yellow. Outer wing- and tail-feathers deep brown or black. Bill and feet black. Irids reddish.

7. TURDUS SCAPULARIS*.

Seems to resemble the *T. chrysogaster*, except in being much smaller.

Head and back yellowish-green. Throat and breast golden-yellow. Vent-feathers white. Wing-feathers black, variegated with white, and tinged with green. Tail green and black.

8. TURDUS STRIGA.

Seven inches in length, with rather a thick heavy body. Back, wings, and crown of the head of a shining blue-black; under-parts, forehead and neck greyish-white. Wing-coverts edged and tipped with white. Bill short, nearly straight, and scarcely notched. The colours of the female are much duller, and the upper parts are brown.

9. TURDUS AMBIGUUS.

A very small species, scarcely five inches in length; general colour blueish-grey, inclining to black on the head, breast, wing-feathers and tail, and nearly white on the belly and edges of some of the wing-feathers. There is a broad white stripe below the eyes. Bill short, curved, and without any perceptible notch.

* *Jora scapularis.* Horsfield, p. 152.

MUSCICAPA.

1. MUSCICAPA cærulea, *Gmel.*

2. MUSCICAPA Javanica, *Sparm. Mus. Carls.*

Moorai Kandang. موري كندغ

3. MUSCICAPA rufigastra.

Dark blue above, passing into black on the wings and sides of the head. Under-parts ferruginous. Bill and legs nearly black.

4. MUSCICAPA latirostris.

Is remarkable for the extreme breadth of its bill. It is a very small bird, less than five inches in length, of a light brown above, and whitish beneath.

MOTACILLA.

1. MOTACILLA Indica? *Gmel.*

Resembles the *M. Indica*, but is white beneath.

2. MOTACILLA bistrigata.

From six to seven inches in length. Tail as long as the body. Back greenish-brown; head dark grey; wing- and middle tail-feathers brown; breast and belly yellow, sometimes passing into white on the throat. Two feathers on each side of the tail white.

3. MOTACILLA gularis.

Burong Pooding. بورغ ڤوديڠ

Brown above, yellowish beneath; head, wings and tail ferruginous; throat and breast marked with longitudinal black spots. Five inches in length.

4. MOTACILLA

4. MOTACILLA OLIVACEA.

Olive-brown above; throat and breast white; abdomen yellow; wings and tail brown, the latter with a black band near the tip. Is five inches and a half long.

5. MOTACILLA SEPIUM.

KACHICHI. كچيچي

Four inches and a half in length. Back, wings and tail dusky-green; under-parts white. Head ferruginous red; bill brown; legs reddish.

6. MOTACILLA FRONTALIS*.

The whole of the upper parts are a fine blue; the throat is nearly white; the belly of a dirty reddish-white. The fore-head is black, and the eyes are encircled with the same. Irids nearly white. Bill red, straight, without notch, broader at the base. Legs dusky. Hind-toe remarkably long.

LOXIA.

1. LOXIA PHILIPPINA, *Linn.*

This species, well known by its curious hanging nests, is called by the Malays Tampooa, تمڤوا; and by the Sumatrans Pintau, ڤينتو. It is the same as the Bayah of Bengal.

2. LOXIA MALACCA, *Linn.*

* *Sitta frontalis.* Horsfield, p. 162.

3. LOXIA

3. LOXIA oryzivora, *Linn.*

Gelatik. گلاتيك. The Java Sparrow.

This species is comparatively rare in Sumatra.

4. LOXIA leucocephala.

Pipit bondol. ڤيڤت بندول

Is about the size of the *L. Malacca*, of a reddish-brown or chesnut colour, growing darker towards the tail, and becoming almost black on the abdomen. Head and neck almost white. Bill blueish; legs black.

5. LOXIA prasina, *Sparm. Mus. Carls.*

Rannas. رانس

This is a very beautiful species, in some degree intermediate between *Loxia* and *Fringilla*.

It is of a bright green on the head, back and wings; blue on the throat and forehead; dirty green on the breast; red on the middle of the abdomen; and passing into a rusty yellow towards the vent. Tail-coverts and base of the tail-feathers vermilion, their extremity black, as are also the outer wing-feathers. The two upper tail-feathers are nearly twice as long as the rest. Bill of a fine black, conical, round at the base; both mandibles a little scolloped towards the middle, which is not very apparent when they are closed, as the lower is then received within the upper.

They are frequently seen in the rice-fields, and are great destroyers of the grain, as well as the other *Loxiæ*.

ALAUDA.

ALAUDA.

1. ALAUDA PRATENSIS, *Linn.*

LANCHA LANCHA. لنچه٢

Or, HAMBA PUYU. همب ڤويو

2. ALAUDA.

LETTI LETTI. لتي٢

Smaller than the former; brownish above, yellow beneath.

HIRUNDO.

LAYANG LAYANG. لايڠ٢

1. HIRUNDO ESCULENTA, *Linn.*

Little can be added at present to the accounts already given of this bird, and the edible nests for which it is so celebrated. There are caves in various parts of Sumatra to which these birds resort, but from want of care and management they are not productive.

2. HIRUNDO RUSTICA, *Linn.*

3. HIRUNDO URBICA.

CAPRIMULGUS.

CAPRIMULGUS EUROPÆUS, *Linn.*

SANG SAGAN. سڠ سگن

Of this there are two varieties, one with much brighter and more marked colours than the other. They are very abundant in

in the neighbourhood of Bencoolen, and are always seen flying about in the evening. They make no nests, but lay their eggs on the bare ground.

COLUMBA.

Poonai. ڤوني

1. COLUMBA Jambu, *Gmel.*

Poonai Jambu. ڤوني جمبو

A most beautiful species, about ten inches in length, green above, pure white beneath. Head crimson, a stripe of deep cinnamon colour on the throat below the bill. A softened crimson spot on the middle of the breast. Tail-feathers equal, green, like the back, with whitish or cinereous tips. Lower tail-coverts fulvous. Bill yellow, nearly straight. A yellowish naked space round the eyes. Irids orange. Legs feathered nearly to the toes, which are red.

This species varies considerably at different ages. When very young it is almost entirely green. The head first assumes its red colour by degrees, the lower parts next become lighter, and it is not till the period of maturity that they acquire their full whiteness. The red spot on the breast is the last colour that appears; and it is doubtful whether the female ever has it.

2. COLUMBA ænea, *Linn.*

Pergam. ڤرگم

This is a very large and beautiful species, exceeding fifteen inches in length. The back and wings are of a brilliant deep green with a variable gloss of gold and copper. The head, neck and under-parts are of a claret-coloured grey. The tail

above

above is nearly of the same colour as the back, but with more of a blueish tint; below it is brown, and the lower tail-coverts are of a deep red-brown. The upper part of the tarsi is feathered; the feet are red. The bill is generally blueish, rather straight, hooked and gibbous at the point. Irids blue.

The female scarcely differs in colour from the male.

3. COLUMBA BADIA.

LAMPATTU, or PERGAM KALABU. لمفتو

A larger species than the preceding, to which it seems to have considerable affinity. It is sixteen inches in length, of a chesnut-red on the back and wing-coverts. The under-parts are of a blueish vinous tint, which extends round the neck, and becomes a blueish-grey on the head and cheeks. The wing-feathers are of a deep brown approaching to black; those of the tail, which are long and nearly equal, are almost black, with a cinereous tinge at the tips. The lower tail-coverts are white. Bill and feet red. Legs feathered nearly to the toes. There is no naked space round the eye, but the circle of the eyelids is bright red. The iris is white.

4. COLUMBA JAVANICA? *Gmel.*

POONAI TANNA. ڤوني تانه

LIMOO-AN of the Sumatrans. لموان

Back and wings of a bright metallic-green, with a gloss of gold. Lower parts of a vinous red, paler on the abdomen. The back of the head and neck are of a cinereous blue, becoming whitish on the forehead and temples. The wing- and tail-feathers are black. The bill and feet are red.

 It

It is called Poonai Tanna, because it is generally seen on or near the ground, and rarely upon trees. They are caught by means of the following device: A small mat shed is erected sufficient to conceal the fowler; a space is cleared in front of it, and a tame Pigeon placed on it: a trumpet is then blown within the hut, and the wild Pigeons are attracted by the sound; when they alight they are taken by a running-noose at the end of a wand, which the fowler manages without being seen by the birds.

5. COLUMBA vernans, *Linn.*

Poonai. ڤوني

The common Green Pigeon.

The female is nearly of an uniform green colour. In the male the head is of a blueish-grey, becoming vinous on the neck, and with an orange patch on the breast. There is no naked space round the eyes.

6. COLUMBA curvirostra, *Gmel.*

Poonai Ubar. ڤوني اوبر

The female wants the chesnut colour on the back. There is a naked space about the eyes of a bright glaucous colour.

7. COLUMBA Amboinensis, *Linn.*

8. COLUMBA Turtur, *Linn.*

Balam, or Terkooku. بالم تركوك

9. COLUMBA

9. COLUMBA Bantamensis, *Sparm. Mus. Carls.*

Katitiran. كتيتيران

About eight inches in length. The colour on the breast is of a vinous red, much less bright in the female than in the male.

The natives reckon three varieties of the Katitiran, differing in size. They are very generally kept tame, and, as well as the Balam or Turtle, are trained to fight with each other. Poonai is the generic name of the Doves which the Malays distinguish from the Balam or Turtle family by being less exclusively granivorous. The Dove is a subject of Malay poetry as much as it is of European.

PAVO.

1. PAVO cristatus, *Linn.*

M'ra, or Marak. مرق

The common Peacock is a native of the Malay peninsula and of Java, but is not common near Bencoolen.

2. PAVO bicalcaratus, *Linn.*

Kuaow Chirmin. كواو جرمين

This beautiful bird is frequent throughout the Malay peninsula, and is also known in Sumatra.

PHASIANUS.

1. PHASIANUS Gallus, *Linn.*

Ayam Utan, or Brooga. ايم هوتن بروڬ

This is the *Gallus Bankiva* of Temminck, and is frequent in the forests of Sumatra.

2. PHASIANUS ignitus, *Latham.*

Tugang. توڬڠ

This species is larger than a Cock, and is of a fine steel-black colour. The lower part of the back is of a fiery ferruginous tint. The four middle tail-feathers are white, and there are narrow white streaks along the middle of the feathers on the sides of the breast. The head is ornamented with a crest of tufted feathers, and the naked cheeks are of a fine ultramarine blue. The legs are armed with long and remarkably strong spurs.

The female is smaller, and has none of the brilliant colours of the male. It has no crest, and the whole plumage is of a mixed brown and black; there are no white feathers in the tail, and the flame-coloured patch on the back is wanting. In the young of both sexes the colours are equally dull.

3. PHASIANUS Argus, *Linn.*

Kuaow. كواو

This magnificent bird, the pride of the Malayan forests, in elegance of form and richness of attire is perhaps unequalled in the feathered race. They are found in the deep forests of Sumatra, generally in pairs; they are said by the natives to make a galangan, *i. e.* to dance and strut about each other in the manner of the Peacocks. The plumage is too well known to require description. Their total length is frequently five feet, and the two middle tail-feathers exceed three.

In a Malay poem, descriptive of the birds of Sumatra, the Argus Pheasant is thus shortly but aptly characterised: "In the superb and many-coloured Kuaow, it is impossible to discover a single fault save one, the difficulty of pronouncing its name."

4. PHASIANUS

4. PHASIANUS ERYTHROPHTHALMUS.

MIRA MATA. ميره مات

This species is as large as a common fowl. The plumage is black, with a blue and green gloss; on the back and wings it is finely undulated with white or grey. The wing-feathers are brown. The feathers of the tail, disposed as usual in two inclined planes, are of a bright rufous or ferruginous colour. The tail-coverts are tinged with purple or violet. The naked space on the cheeks is of a bright red. There are no wattles or crest. The bill is blackish and strong; legs blueish, and armed with strong spurs.

The female differs from the male in being entirely of a steel-black, without white undulations or rufous tail. In the young ones also the tail is black.

5. PHASIANUS RUFUS.

BURONG TRAB. بورغ ترب

This, which does not appear to have been hitherto described, is larger than a common Cock, being about twenty inches in length. The plumage above is of a deep ferruginous colour, finely mottled with black. The feathers of the breast are also ferruginous, but each has a black band, and is edged with white, while those of the abdomen are principally white and dusky. The chin is nearly white. On the head is a crest, which lies backward, but can be elevated in some degree. The naked space on the cheeks is blue. The irids are red. The tail is not long, and is similar in colour to the back. The legs are sometimes reddish, sometimes blueish, and are unarmed, there being only a small tubercle in place of a spur. The female differs but little from the male.

TETRAO.

TETRAO.

1. TETRAO VIRIDIS, *Gmel.*

BENIOL. بنيول

The male of this species has been described under the name of *Columba cristata*, but its proper place is under *Tetrao.* I am at a loss to perceive any good reason for placing it under *Phasianus*, as Cuvier has lately done.

It is rather smaller than the common Partridge. The whole plumage of the male is of a glossy deep green, approaching to black. The quill-feathers are brown mottled with black. On the head is an elevated crest of filiform feathers of a bright red brown colour, in front of which are a patch of white and a small fascicle of erect black bristles. The eyes are surrounded by a narrow circle of red imbricated scales; and there is a small naked red space behind them. Irids yellowish. Legs red, unarmed; hind toe without a claw.

The female differs from the male in having no crest, and in being of a grass-green colour with the exception of the head, which is nearly black. There are sometimes a few long plumose bristles on the forehead.

2. TETRAO OCELLATUS.

BURONG TROONG. بورغ تروغ

This beautiful species is of the same size as the preceding. The head, neck, breast and belly are of a bright rufous or ferruginous colour, barred on the sides with black. The back is black, with yellowish bands across the upper part, and marked behind with arrow-shaped spots of the same rufous colour as the lower parts. The wings are blackish, each covert marked with

with a round black spot. The tail is short and black, with rufous variegations. The top of the head is marked with black, and there is a black stripe over the ears. There is no naked space about the eyes, in which it agrees with the *Coturnices*, but the legs of the male are armed with blunt spurs, sometimes double. The bill is black; the irids yellowish-grey. The hind toe has only a very small horny tubercle in place of a nail, which approximates this species to the *T. viridis*.

3. TETRAO CURVIROSTRIS.

LANTING. لنتيغ

This approaches nearest to the *T. Gingicus*, but must be considered a distinct species.

It is larger than the common Partridge, and is remarkable by having the upper mandible arched, and much longer than the lower, often forming a nail-like hook at the point. The top of the head and neck are dark brown; the throat and cheeks rufous. The upper part of the breast is of a blueish-grey or lead-colour, which extends nearly round the neck; the back and upper part of the wings are brown variegated with black and grey, while the shafts of the feathers are yellowish. The lower part of the back, wing- and tail-feathers are dull yellowish finely mottled with grey, and marked with some black points. The abdomen is light ferruginous, passing into white behind. The bill is black; the legs whitish or lead-coloured, armed with short thick spurs. There is a naked space behind the eyes; irids orange. The female is a little smaller than the male, and the young ones want the lead-grey on the neck.

4. TETRAO Sinensis, *Linn.*

Pikau. ڤيکو

The male of this has been fully described; the female differs considerably, wanting entirely the white on the throat. Its upper parts are grey mottled with black, and the shafts of the feathers white. The throat is yellowish-grey; and the under-parts are the same, with black bars.

They are seen in flocks, often a hundred together.

5. TETRAO Luzoniensis, *Gmel.*

Puyu. ڤويو

This is a tridactylous species of Quail. The colours vary much in different specimens. The head, back and wings are varied with black, brown, and fawn-colour, of which sometimes the one, sometimes the other predominates. In full-grown birds the head is generally black, spotted with white, particularly at the sides, while the back is more of a red-brown, and the wings are black banded with white. The breast also varies, being sometimes ferruginous, but at a later period becoming marked with transverse bars of black and white. The abdomen is always of a ferruginous colour. The throat is black in the males, generally whitish in the females. Bill rather long, yellowish, which is also the colour of the legs. The irids are white.

These Quails are frequently kept tame, and the females are trained to fight with each other by the natives of the country. The superior courage of the females of this species has given rise to a common Malay proverb, in which a hen-pecked husband is compared

compared to a Puyu. The Puyu is always seen in pairs, never in flocks like the preceding.

I am at a loss to discover what species of Quail is intended by the *T. Suscitator*, or Indian Quail of Bontius. The Pikau and Puyu are the two generally known throughout the eastern islands. The latter is the most frequently domesticated, and becomes as tame as the common fowl. It is the one trained for fighting; and they will often combat with such fury as to kill each other. It is not however noisy, and in the wild state is only seen in pairs. The Pikau, on the contrary, has a loud clear note, is seen in flocks, will not become so tame as the other, and is not valued for fighting. It would seem as if the manners of both these were confounded in the account given of the *T. Suscitator*.

ARDEA.

1. ARDEA DUBIA, *Gmel.*

BANGOU SULA. باڠو سوله

Or, BURONG KAMBING. بورڠ کمبيڠ

Also, BURONG GAJA. بورڠ گاجه

A small variety, with nearly black back and wings. The Argal is not so abundant in the eastern islands as in Bengal.

2. ARDEA ALBA, *Linn.*

BANGOU PUTI. باڠو ڤوته

3. ARDEA SUMATRANA.

A large subcrested Heron, with long slender neck and bill, of a blueish-grey, variegated with ferruginous; white on the chin.

4. ARDEA melanolopha.

Has a shorter thicker neck; is of a chesnut colour mottled with black; tail and crest black; bill rather short. Belly variegated with white, black and brown. It is about eighteen inches long.

5. ARDEA cinnamomea, *Gmel.*

Burong Kaladi. بورغ كلادي

Much smaller than the preceding; subcrested; of a bright chesnut colour, slightly mottled.

6. ARDEA picta.

Puchong Udang. ڤوچوڠ اوداڠ

Is about sixteen inches in length; of a dark-brown colour, approaching to black, mottled with fawn and white. Legs and bill short, strong and greenish.

7. ARDEA Javanica*.

Burong Puchong. بورغ ڤوچوڠ

Is about fifteen inches in length, of a greenish-brown above, blueish-grey below. The feathers of the head are of a dark olive-green, and elongated into a pendent crest. The neck is rather short. The bill dusky and yellow. Lores green. Legs yellowish.

* *Ardea Javanica.* Horsfield, p. 190.

TANTALUS.

TANTALUS.

1. TANTALUS Ibis. Var.

2. TANTALUS cinereus.

Is smaller than the preceding; of a light-grey colour, with the exception of the abdomen and rump, which are white; and the wing- and tail-feathers, which are black.

SCOLOPAX.

1. SCOLOPAX arquata, *Linn.* Var.

Terok. تيروق

There are two varieties of this; a large, called Terok Indo ayam, or Terok Gaja; and a smaller, called Terok Padi.

2. SCOLOPAX Gallinago, *Linn.*

Sekadidi. سكديدي

The Snipe.

3. SCOLOPAX Capensis, *Linn.*

4. SCOLOPAX Sumatrana.

Kooning Kaki. كونيغ كاكي

A small species, with long bill curved upwards. Grey above, white beneath. Quill-feathers blackish.

CHARADRIUS.

1. CHARADRIUS Œdicnemus, *Linn.*

Gadang Kapala. گدغ كفال

Two varieties.

2. CHARADRIUS pluvialis, *Linn.* Var.

Cheruling. چروليغ

3. CHARADRIUS Hiaticula, *Linn.* Var.

Burong Booi. بورغ بوي

RALLUS.

1. RALLUS gularis*.

Ayam Ayam. ايم٢

Brown, with small white bands; lighter coloured beneath. Bill dirty red. Legs blackish.

2. RALLUS Sumatranus.

Rua Rua. رواق٢

Nearly black above; white beneath; ferruginous near the vent. Bill blackish. Legs dusky.

3. RALLUS fasciatus.

Chesnut above; breast and throat ferruginous; abdomen transversely barred with black and white. Quill-feathers dark brown, with some white bars. Bill blueish-black. Feet red. Irids red.

* *Rallus gularis.* Horsfield, p. 196.

GALLINULA.

GALLINULA.

1. GALLINULA ORIENTALIS*.

This is probably only a variety of the *Gallinula Chloropus*.

STERNA.

1. STERNA STOLIDA, *Linn.*

2. STERNA CANTIACA? *Gmel.*

SAMAR LAUT. سامر لاوت

The prevailing colour is a delicate blueish-grey or lead; the head capped with black, with some white spots in front. Throat, cheeks and lower tail-coverts white. Wings much longer than the tail. Bill and legs dusky-red.

3. STERNA PANAYENSIS? *Gmel.*

Blackish-brown above, white beneath. A white stripe from the base of the bill to the eyes. Vertex black mixed with white; occiput, back of the neck and wings black. Tail of the colour of the body. Wings about the same length as the tail. Bill and legs black.

4. STERNA SUMATRANA.

A small species with short tail, and wings about the same length with it. The prevailing colour is white, tinged on the back, head and wing-coverts with light reddish-brown, and mixed with a few dark spots. A blackish crescent extends from eye

* *Gallinula orientalis.* Horsfield, p. 195.

to

to eye round the back of the head. Wing-feathers lead-grey, the first one nearly black. Lower parts snow-white. Tail of the same colour as the back.

PELECANUS.

1. PELECANUS Philippensis, *Gmel.*

2. PELECANUS Manillensis, *Gmel.*

Lampipi. لمقيقي

These two appear to be little more than varieties of the *P. Onocrotalus.* Further observations however are required to decide whether or not the differences they exhibit are sufficiently constant to entitle them to the rank of species.

3. PELECANUS leucocephalus, *Gmel.*

Dandang laut. دنداغ لاوت

This appears to be sufficiently distinct from the *P. Aquilus,* though pronounced to be the same by M. Cuvier.

4. PELECANUS Sula, *Linn.*

The Booby.

PLOTUS.

PLOTUS melanogaster, *Gmel.*

Dandang Ayer. دنداغ اير

ANAS.

ANAS.

Of this genus the most common is a species of Teal, called Bilibi.

It is about twelve or fourteen inches in length, the back blackish, the feathers on the upper part tipped and edged with brown. Upper part of the wings dark-chesnut; quill-feathers black. Crown of the head dark-brown; neck cinereous, which colour passes into ferruginous on the breast and abdomen. The hind toe is free.

Of the remaining classes it would be tedious to enter here into a detailed account; the more particularly, as the largest proportion of the subjects are forwarded for examination and description in Europe, it being impossible to enter into minutiæ in this country, without occasioning delay and detriment to other more pressing avocations. Drawings of the most remarkable have been made; and the specimens, for the most part preserved in spirits, and accompanied by a catalogue, will afford every facility for detailed examination at a distance. The following general account may therefore suffice for the present purpose.

AMPHIBIA.

In the first division of Amphibia, the species in the collection are not numerous. Of the Sea Tortoises, the *Testudo Mydas*, or Katong, كاتوڠ, and *T. imbricata*, or Katong Kara, كاتوڠ كارة, are the most common, and are found in most parts of these seas. The tortoise-shell of the latter is a considerable article of commerce at Singapore and other places.

Two species of fresh-water Tortoises are known by the names of

of Labi لابي and Baning بانيڠ ; and the Land Tortoises are called Kúra Kúra كورا٢. One of those in the collection is probably the *T. serrata*.

Of *Lacertæ*, the *L. Crocodilus*, or Buaya, بواي is abundant on all the coasts of these islands and at the mouths of rivers. It often attains to a great size. The next is a variety of the *L. Monitor*, called Biawak, بياوق, whose spots are of a bright yellow. It grows to be more than six feet in length, and often commits depredations in the poultry yards. A second variety is called by the Malays Biawak Poongor, and is chiefly distinguished by having a shorter tail. It is said not to eat flesh, like the preceding, but to live chiefly on leaves and fruit, and to reside mostly in the water.

Of the *L. Gecko* there are two kinds, one called Toké, توكي which is in the collection, and the other Gogok, ݢوݢق both which names are imitations of the cry of the animal. The people of Sumatra have no dread of them, but, on the contrary, sometimes keep them in their houses for the purpose of destroying vermin, and have no idea of their being poisonous.

There are two varieties, differing chiefly in colour and the arrangement of the spots, which appear to belong to the *L. scutata*, Linn. They are called Grooning ݢرونيڠ by the Malays, and are said to change their colours, particularly in dying.

The Binkasa بيڠكاس is a small long-tailed green Lizard.

The *Draco volans* (Chichak Terbang) چيچق تربڠ is frequent in the Malay islands, and is believed by the inhabitants to be very poisonous. All these animals are sufficiently known, not to require particular description.

Of *Rana* there are three species in the collection, called by the Malays Kodok botong botong, Kadok Kangkong, and Kadok Kessé. From the heart of the latter a poison is said to be prepared by the natives.

SER-

SERPENTES.

About twenty species are in the collection, some of which are new. Among those already well known, may be enumerated the *Coluber Naja*, or *Cobra di Capello*, called by the natives Ular mataharee and Ular Sindo, اولر سندق, اولر متهاري, which is frequently met with in the neighbourhood of Bencoolen. Mr. Marsden appears to have fallen into an error in stating that this species was not known here; but it is remarkable, that notwithstanding the existence of this and other poisonous snakes, we scarcely ever hear of instances of any person being bitten, a circumstance which the people ascribe to the power of a Kramat, or burial-place of a saint; but which perhaps may be accounted for from the thinness of the population. The *Cobra di Capello* of Sumatra is of a lighter colour than that of India, and the spectacles of the hood are less distinct. The fangs also are smaller.

The *Coluber Bucephalus* is also found in Sumatra.

Of the *Coluber gramineus* there are two varieties, not uncommon in the islands.

The *Coluber mycterizans*, Ular Daun اولر داون of the Malays, is one of the commonest snakes of Sumatra and the neighbouring islands, where it is chiefly observed on trees.

There is another species considerably resembling it, and called Ular Lidi, اولر ليدي, which has the power of elevating the scales of the neck, which are of a darker colour on their under surface, and thus producing a variegation of colours, which disappear when the animal is at rest, much in the manner described by Russel of the Botla Paseriki, Pl. 13. The scale immediately above the anus has a black line along its middle, giving it the appearance of being double.

One of the most remarkable snakes in the collection is a green one,

one, called by the Sumatrans Ular Poochook, اولر ڤوچق, which has some resemblance to the *C. gramineus*, but is larger and much more venomous, being peculiarly distinguished by having two fangs on each side, of extraordinary length.

This species appears to be undescribed, and may be named *C. Sumatranus*.

It is about four or five feet in length, and rather thick. The head is large and obtusely triangular, with two large plates above each eye. The general colour is green; but the body is encircled by several irregular black rings, and the tail is of a reddish colour. Each scale on the body is edged with black. The fangs are above half an inch in length, white and slender, curved backwards. The number of abdominal scales is 184; of caudal 69. It is found in the forests, chiefly upon trees, and considered very dangerous.

Another snake, which appears to be new, was found at Singapore, and is related to *C. Dipsas* by the large dorsal scales. It is not venomous; is about six feet long, and of a pretty uniform reddish colour, becoming rather dusky on the head and light on the belly. There are several other snakes of less importance, among which the Ular Tanna, or Ground Snake, and Ular Chindi, marked with red spots along the sides, may be principally noticed.

The *Boa Constrictor* is occasionally found in Sumatra. One in the collection measured eleven feet and a half in length. A portion of the skin of another was brought to me from the interior of Sumatra, which, when dry, was upwards of twenty-one inches in circumference.

The *Acrochordus fasciatus*, or *Hydrus granulatus* of Schneider, is sometimes but rarely met with on the coasts of Sumatra.

Of *Hydrus* there are three species or varieties, having considerable

derable resemblance to each other, and therefore not easily discriminated.

PISCES.

In this department the collection is deficient, most of the specimens procured at Penang and Singapore having been lost, and time not having been yet afforded to complete the drawings. The following is a list of those most commonly found in the Straits of Malacca, and of which outlines of the form and characters have been preserved. A few only have yet been procured on the west coast of Sumatra.

Muræna . . . one species.

Trichiurus } Lepturus, *Linn.*
argenteus, *Shaw.*

Gadus, *Linn.*
Batrachus, *Schn.* } Tau.

Echeneis Neucrates.

Coryphæna Hippurus.

Gobius Schlosseri.

——— niger, *var.* and two other species, probably undescribed.

Cottus . . . . . one species.

Zeus . . . . . . one species.

Pleuronectes bilineatus.

——— macrolepidotus?

——— Zebra, and another species.

Chaetodon . . seven species.

Sparus . . . . . two species.

Labrus . . . . . one species.

Sciæna . . . . . four species.

Perca . . . . . . ten species.

Gasterosteus . one species.

Scomber Madagascariensis, and five other species.
Trigla volitans.
Silurus . . . . . two species.
Platystacus anguillaris.
Salmo . . . . . one species.
Esox becuna.
—— belone.
—— marginatus.
Exocœtus volitans.
Polynemus . . two species.
Clupea'. . . . . eleven species.
Ostracion cornutus.
Tetrodon hispidus.
Diodon Hystrix.
Syngnathus Hippocampus.
Balistes biaculeatus, and another species.
Raia guttata.
—— Thouiniana, and eight other species.

INSECTA, VERMES, &c.

Seseral cases of insects, arranged according to the Linnean order, have been forwarded for examination in Europe, and more are daily collecting.

Upwards of fifty species of Cancer, many of which are probably new, are also forwarded for arrangement and description in Europe.

In these classes generally it may be observed, that no opportunity has been lost of increasing the collection; but from their nature they do not admit of that minute examination in this country which they require, and where time can ill be spared from the new and more important subjects which continually press upon the attention.

The

The Zoophytes have not been unattended to, and will hereafter be particularly considered when leisure shall be afforded to make drawings and examine the subjects with more accuracy. The coast of Sumatra is particularly rich in Madrepores, Millepores, Isis, Antipathes, Gorgoniæ, Alcyonia, and Spongiæ, &c.

APPENDIX.

Since closing the preceding parts of this account, a specimen of a very singular and rare animal, called by the Sumatrans Singapooa سيڠاڤوا has been procured, and also a new species of *Buceros* and one of *Strix*. The former appears to be the *Lemur Tarsier*, hitherto imperfectly known.

LEMUR TARSIER.

This animal is about six inches in length from the nose to the tail, which is about nine more. The hind legs are remarkably long, and the feet are very peculiar. The extremities of all the toes, on both the fore- and hind-feet, are dilated into a round, flat, fleshy callosity, which seems to enable the animal to hold with more advantage on the trunks of trees. At many of the joints of the feet and toes are similar callosities, but not so large. On the toes of the fore-feet there are no claws, their place being supplied by small scale-like processes occupying the centre of the upper surface of the rounded extremities of the toes. On the hind-feet three of the toes are in like manner unarmed; but the fore and middle toes are furnished with claws, which are sharp, somewhat curved, and stand nearly erect from the middle of the flat rounded extremities of the toes. The head is round, and the face broad; the

the mouth is wide, and the lips singularly crenated within. The pupils of the eyes are so large, that scarcely any other part of the eye is visible; the ears are large, and project laterally. The whole face has a peculiar and singular aspect, the grinning mouth giving it an odd expressiou of risibility. The number of teeth has been differently stated by authors. In this specimen there appear to be four above and the same number below, of which the middle two are the longest in the upper jaw, and the outer two longer in the lower. The canines of the upper jaw are longer than those of the lower, and are followed by a tooth which, from its proximity to the canine and distance from the other molars, might almost be taken for a second canine: in the lower jaw there is a vacant space between the canines and the molars. The tail is nearly naked to within an inch of the extremity, where it is tufted with hair.

The animal has been forwarded in spirits to Sir Everard Home: it will therefore be unnecessary to enlarge more upon it here.

The name Singapooa appears to be given to it from some fancied resemblance to a Lion, Singa signifying a Lion, and Pooa (the generic name of the Scitamineous plants) being employed figuratively to denote smallness. It is related in the fables of the country, that the animal was originally as large as a Lion, but has degenerated in modern times to the size we now find it.

It is only seen in the depth of the forests, and that very rarely, once perhaps in two or three years, and is said to live on various kinds of wild fruits and young leaves. It is said to ascend trees by short leaps, and to produce only one young one at a time. The inhabitants have a superstitious dread of these animals, insomuch that, if they happen to see one upon any tree near their ladangs or forest rice-fields, they will immediately abandon them and

seek

seek another spot; otherwise they believe some misfortune will certainly befall them or their family.

BUCEROS COMATUS, *R.*

This species differs from all the others of the genus in the acuteness of the keel or arch of the upper mandible, which is also much shorter than usual, being scarcely six inches in length. The head and neck are covered with white feathers, more or less black at their roots. These feathers are wiry or filiform, and stand nearly erect, particularly on the top of the head, while on the forehead they are directed forwards over the crest of the bill and conceal it in part. On the sides of the head the feathers lie flat, and are directed upwards, so that the whole head looks as if surmounted by a stiff mane, or the furred crest of a helmet. The bill is of a dark horny colour, somewhat triangular, being broad at the base, and sloping to the point. The arch of the upper mandible is acutely carinate, and the crest, in my single specimen, not much elevated, equally carinate with, and parallel to the arch of the bill, and sloped off to it a little beyond the middle. It will require the examination of other individuals to ascertain whether the crest ever grows larger; but I think it cannot alter much. The irids are of a greenish-yellow. The back, wings and tail are of a dark brown, the belly of the same colour mixed with white. The wing- and tail-feathers are all tipped with white at their points. The legs are nearly black.

STRIX.

Of this genus a very large and probably new species has recently been procured in the neighbourhood of Bencoolen.

It is about two feet in length. The ground-colour is a light fawn, the feathers in the upper part being broadly shaded with

with dark brown along their middle; those of the back, wings and scapulars being moreover marked with two dirty white spots, which are sometimes confluent, forming a transverse stripe. On the under-parts each feather is marked with a narrow longitudinal black line. The wing- and tail-feathers are blackish, and banded with white and fawn-colour, their tips being white. The feathers on each side the head are elongated into horns. The eyes are surrounded by an imperfect circle of bristly feathers. The ears are rather large; the bill is black and hooked; the claws very strong and arcuate.

T. S. R.

Fort Marlborough,
June 1, 1820.

XIX. *A Mo-*

XIX. *A Monograph of the Genus Saxifraga. By Mr. David Don. Communicated by A. B. Lambert, Esq. V.P. L.S.*

Read February 20, 1821.

In the following monograph of a very interesting and difficult genus of plants, my principal object is to endeavour to determine the limits of species on more satisfactory grounds than I conceive has hitherto been done. As for six or seven years, during which my attention has been directed to this subject, I have had opportunities of cultivating many species of *Saxifraga*, both foreign and British, and of observing the greater part of the latter in their native habitats, I hope, in some cases at least, to have been enabled to fix on those distinguishing marks which are most constant in determining the species.

It has been proposed by some botanists to divide *Saxifraga* into several genera: these subdivisions appear to me, however, to rest on very insufficient grounds; and that the genus as it now stands, consisting of sections which gradually pass into each other, is truly natural.

The species of *Saxifraga*, although most abundant in the higher latitudes, are still very widely extended over the surface of the globe. In the polar regions, many of them are found even near the level of the sea; and within the tropics, on the summits of the loftiest mountains; but the cold and elevated regions of the north of Asia, Europe and America are the favourite habitats of the genus.

 I have

I have been particularly careful in the selection of synonyms; these I have considerably augmented and corrected, as will hereafter appear; doubtful ones I have in most instances excluded, as they would unnecessarily increase the bulk of the paper, without adding to its utility. For many of the new species contained in this paper I am indebted to the splendid Herbarium of the late much-lamented President of the Royal Society, the Right Honourable Sir Joseph Banks, Bart., whose death will be long felt throughout the scientific world; and whose name, whose talents and liberality are too well known to require any additional eulogium from my feeble pen. To Aylmer Bourke Lambert, Esq. I am also infinitely indebted for liberally permitting me to examine the species contained in his vast collection; and especially in that portion comprising the Herbarium of the celebrated Pallas.

I have divided the genus into sections and subdivisions, to both of which characters are given; those of the sections being derived from the parts of fructification, and those of the subdivisions from the form of leaves and other differences in habit. Without any further remark, I shall now beg leave to lay before the Society a Synopsis of the genus.

Conspectus et Separatio Saxifragæ *Generis.*

SAXIFRAGA. *Linn., Juss.*

Syst. Linn. Decandria digynia.

Ord. Nat. Saxifrageæ. *Juss.*

Char. Essentialis. *Calyx* 5-fidus. *Petala* 5, integra. *Stamina* 10. *Styli* 2, persistentes. *Capsula* 2-locularis, 2-valvis è stylis persistentibus birostris: intra rostra foramine orbiculari aperiens, polysperma. *Semina* minuta, lævia.

Sectio 1. Bergenia, *Mœnch.*

Calyx campanulatus, 5-fidus, extus rugosus: *segmentis* conniventibus. *Petala* unguiculata, calyce inserta. *Stamina* fauce calycis inserta; *filamenta* subulata; *antheræ* subrotundæ. *Styli* intus cavi seminibus pleni! basi coaliti, demùm turgidi et in capsulam profundè bipartitam transientes. *Stigmata* semiglobosa, glabra. *Semina* cylindracea.

Herbæ *perennes.* Radix *crassa, lignosa.* Folia *ampla carnosa.* Petioli *stipulis integris membranaceis secus bases utrinque adnatis instructi!* Scapi *crassi, denudati.* Flores *thyrsoideo-paniculati, rubri.*

Species.

1. crassifolia
2. cordifolia
3. ligulata.

Sectio 2. Gymnopera.

Calyx 5-phyllus, reflexus. *Petala* hypogyna, sessilia. *Stamina* hypogyna; *filamenta* clavata; *antheræ* reniformes. *Styli* conniventes. *Stigmata* simplicia, imberbia. *Capsula* subrotunda, nuda. *Semina* sphærica.

 Herbæ

Herbæ *cæspitosæ, perennes, brevè surculosæ.* Folia *carnosa, indivisa, plerumque cartilagineo-serrata.* Scapi *erecti, ramosi.* Flores *parvi, paniculati, rosei aut albi, punctati.*

Species.

4. Geum	7. arguta
5. hirsuta	8. stellaris
6. umbrosa	9. leucanthemifolia
7. cuneifolia	10. sarmentosa
5. spicata	11. erosa.
6. Nelsoniana	

Sectio 3. LEIOGYNE.

Calyx profundè 5-fidus. *Petala* in plurimis sessilia. *Stamina* fauce calycis inserta ; filamenta subulata. *Styli* recti. *Stigmata* orbiculata, planiuscula, imberbia. *Capsula* à calyce libera. *Semina* subrotunda.

Herbæ *rarò* suffrutices, *humiles.* Radix *fibrosa in pluribus granulosa.* Caules *flexuosi, sæpiùs multiflori, polyphylli.* Folia *in aliis reniformia, lobata, in aliis linearia, indivisa.* Flores *albi aut lutei.*

§. *Foliis lobatis.*

Species.

12. rotundifolia	19. bracteata
13. hybrida	20. rivularis
14. granulata	21. nutans
15. bulbifera	22. orientalis
16. cernua	23. cymbalaria
17. sibirica	24. hederacea.
18. nudicaulis	

§. *Foliis*

§. *Foliis indivisis.*

Species.

25. Hirculus	31. brachypoda
26. flagellaris	32. juniperina
27. myosotifolia	33. aspera
28. aizoides	34. hispidula
29. bronchialis	35. bryoides
30. tenella	36. cherlerioides.

Sectio 4. Micranthes.

Calyx 5-partitus, patens. *Petala* parva, sessilia, patentia, calyce inserta. *Stamina* calyce inserta; *filamenta* brevissima, subulata. *Styli* brevissimi, crassi. *Stigmata* capitata, glabra. *Capsula* depressa à calyce libera.

Herbæ *perennes.* Radix *fibrosa.* Scapi *multiflori.* Folia *indivisa, patentia, lanceolata v. ovata, serrata v. crenata.* Flores *corymbosi, parvi, albi v. flavescentes, in paniculam terminalem dispositi.*

Species.

37. hieracifolia	41. nivalis
38. pensylvanica	42. longiscapa
39. semipubescens	43. davurica
40. virginiensis	44. pyrolifolia.

Sectio 5. Saxifragæ veræ.

Calyx 5-fidus. *Petala* sessilia, perigyna. *Stamina* perigyna; *filamenta* plana, sensìm attenuata. *Stigmata* patentia, plana, spathulata, pube brevi barbata. *Capsula* calyce obvoluta et arctè connata. *Semina* obovata.

Herbæ *perennes v. rarissimè annuæ, humiles, densè cæspitosæ plerumque surculosæ.* Folia *indivisa v. variè partita in pluribus rosulata.*

rosulata. Caules *polyphylli rarò nudi, multi v. pauciflori.* Flores *albi v. lutei aut rarissimè rosei.*

§. *Foliis indivisis plerumque rosulatis impetiolatis.*

Species.

45. Cotyledon
46. lingulata
47. Aizoon
48. intacta
49. mutata
50. media
51. Lapeyrousii
52. aretioides
53. burseriana
54. retusa
55. oppositifolia
56. cæsia
57. diapensioides
58. fimbriata
59. serpyllifolia
60. parnassifolia
61. androsacea
62. spathulata
63. sedioides
64. tenera.

§. *Foliis 5—3-partitis petiolatis.*

Species.

65. geranioides
66. irrigua
67. maderensis
68. pedatifida
69. ceratophylla
70. obtusifida
71. ajugifolia
72. affinis
73. pentadactyla
74. latifida
75. decipiens
76. hirta
77. platipetala
78. incurvifolia
79. denudata
80. Sternbergii
81. pulchella
82. tridentata
83. andicola
84. cæspitosa
85. stellata
86. Bonplandii
87. magellanica
88. exarata
89. Pavonii
90. pedemontana

91. moschata

91. moschata	98. cuneata
92. muscoides	99. globulifera
93. pygmæa	100. hypnoides
94. tricuspidata	101. condensata
95. tridactylites	102. elongella
96. petræa	103. leptophylla
97. adscendens	104. lætè-virens.

DESCRIPTIONES SPECIERUM.

Sectio 1.

1. *S. crassifolia*, foliis ovalibus obtusissimis glabris serrulatis, petalis elliptico-oblongis.

S. crassifolia. *Linn. Dec.* ii. *p.* 27. *t.* 14. *Willd. Sp. Pl.* ii. *p.* 644. *Bot. Mag. t.* 196. *Persoon Synop.* i. *p.* 488. *Hort. Kew.* iii. *p.* 67.

S. foliis ovalibus crenulatis, caulibus nudis. *Gmel. Sib.* iv. *p.* 166. *t.* 66.

Habitat in Siberiæ alpibus. ♃. (v. v. c.)

Radix crassa, lignosa, rudimentis foliorum emarcidorum crebrè tecta. *Folia* petiolata, ovalia, obtusissima, carnosa, glaberrima, lucida, serrulata. *Petioli* teretes. *Stipulæ* latissimè dilatatæ, glabræ secùs bases petiolorum decurrentes. *Scapi* pedales, denudati, nitidi, purpurei, angulati, crassitie ferè digiti. *Panicula* coarctata. *Pedunculi* alterni, racemosi, nutantes. *Pedicelli* unilaterales, numerosi. *Flores* campanulati, magni, rubri. *Laciniæ calycinæ* conniventes, oblongæ, obtusæ. *Petala* elliptico-oblonga, multinervosa.

2. *S. cor-*

2. ***S. cordifolia***, foliis orbiculato-cordatis serratis glabris, petalis subrotundis.

S. cordifolia. *Haworth Misc. Nat.* 157. *Hort. Kew. ed.* 2. 3. *p.* 67.

Geum saxatile rotundifolium majus, flore purpureo. *Amm. Ruth. n.* 90.

Habitat in Siberiæ alpibus. ♃. (v. v. g.)

Præcedenti simillima, at major et robustior. *Folia* orbiculato-cordata, carnosa, ampla, serrata, glabra, lucida. *Petioli* longiores. *Scapus* brevior, crassior, angulatus, glaber, lucidus. *Panicula* thyrsoidea. *Pedunculi* alterni breviores, racemosi, nutantes. *Pedicelli* numerosi, unilaterales. *Flores* campanulati, majores, rubri. *Laciniæ calycinæ* conniventes, breviores et latiores. *Petala* subrotunda, multinervia.

This plant, although it has been long considered as only a variety of the preceding species, nevertheless affords sufficient marks to keep it distinct; and these characters are always constant when raised from seed. It is not, as some have supposed, a garden hybrid or variety. It was found wild in Siberia both by Dr. Amman and the celebrated Pallas, in whose Herbarium, now in the possession of A. B. Lambert, Esq., there are several native specimens.

3. ***S. ligulata***, foliis orbiculato-cordatis, denticulatis, ciliatis, utrinque hirsutis, scapo filiformi dichotomo, petalis latè orbiculatis.

S. ligulata. *Wallich in Act. Soc. Asiat.* xiii. *p.* 398. *cum figurâ.*

S. Pacumbis. *Buchanan Mss.*

Habitat in Nepaliæ, et Bengalæ orientalis, alpibus. *Buchanan, Wallich.* ♃. (v. s. in Herb. Lamb.)

Radix

Radix horizontalis, lignosa, crassitie digiti, rudimentis foliorum emarcidorum imbricatìm tecta. *Folia* ampla, orbiculato-cordata v. rariùs ferè obovata, utrinque scabra, hirsutissima, margine tenuitèr denticulata et pilis crebris ciliata; suprà venis prominentibus reticulata. *Petioli* brevissimi, teretes, quàm in præcedentibus, breviores. *Stipulæ* latissimè membranaceo-dilatatæ, secus bases petiolorum decurrentes, ad margines ciliis paleaceis longis cuspidatis instructæ. *Scapus* erectus, gracilis, filiformis, nudus, læviusculus; apice bifurcus. *Flores* rubri, præcedentibus majores, campanulati, in racemis cernuis unilateralitèr dispositi. *Pedicelli* calycesque scabriusculi. *Calycis Laciniæ* brevissimæ, rotundatæ. *Petala* latè orbiculata, multinervia.

This remarkable and truly distinct species was first discovered on the mountains of Nepal by a distinguished naturalist, Dr. Francis Hamilton (formerly Buchanan), from whom there are very excellent specimens of it in the Lambertian Herbarium. Others have been more recently received from Dr. Wallich, by whose collectors they have been gathered both in the mountains of Nepal and the eastern parts of Bengal. This plant is one of many instances which manifests that striking similarity which exists between the vegetation of Nepal and that of the northern regions of Tartary.

Sectio 2.

4. *S. Geum*, foliis reniformibus crenatis, utrinque pilosis; adultis confertis patentibus, petiolis longissimis teretiusculis villosis, laciniis calycinis ovatis obtusis.

S. Geum. *Linn. Sp. Pl.* 574. *Scop. Carn. ed.* 2. *n.* 491. *Willd. Sp. Pl.* ii. *p.* 448. *Lam. Encycl.* vi. p. 682. *Lapeyr. Saxif. Pyren. p.* 46. *t.* 24. (*bona.*) *Lam. et Decand. Flor.*

Flor. Franc. iv. *p.* 379. *Persoon Synop.* i. *p.* 488. *Hort. Kew. ed.* 2. 3. *p.* 68. *Engl. Bot. t.* 1561. (*optima.*) *Sternberg. Saxif. p.* 15.

S. punctata. *Sternb. loc. cit. p.* 18.

S. foliis reniformibus obtusè crenatis, caule simplici nudo. *Gmel. Sib.* iii. *p.* 161. *t.* 65. *f.* 1.

Geum folio subrotundo minori, pistillo floris rubro. *Magn. Hort. p.* 88. *t.* 88.

Sanicula montana rotundifolia minor. *Bauh. Pin.* 243.

Sedum montanum rotundifolium minus album non guttatum. *Moris. Hist.* iii. *p.* 478. *sect.* 12. *t.* 9. *f.* 12. (*mala.*)

β. foliorum paginâ utrinque glabrâ.

S. elegans. *Mackay in literis.*

γ. triplò major; foliorum paginâ utrinque glabrâ, paniculâ magis diffusâ, petalis majoribus pulchrè punctatis.

Habitat in Sibiriâ; nec non in Pyrenæor. Helvetiæ et Hiberniæ alpibus copiosè, β et γ in Hiberniæ montibus. *J. T. Mackay.* ♃. (v. v. c.)

Planta cæspitosa. *Radix* fibrosa. *Folia* anni præcedentis persistentia, conferta, rigida, humi patentia; juniora erecta, longè petiolata, reniformia, coriacea, crenata: crenaturis imbricatis obtusissimis vix cartilagineis; suprà saturatè viridia; subtùs rubescentia; utrinque avenia, pilis rigidis instructa. *Petioli* longissimi, subteretes, villosi, nunquam dilatati. *Scapus* erectus 4—6-pollicaris, pilis viscidis densè tectus. *Panicula* ramosissima, multiflora: *ramuli* multiflori, variè furcati. *Bracteæ* parvæ, carnosæ, lineares, obtusæ. *Pedicelli* breves calycesque pilis glanduliferis crebrè tecti. *Laciniæ calycis* ovatæ, obtusæ, obscurè 3-nerves. *Petala* ovalia, punctis flavis et puniceis ad basin instructa. *Antheræ* flavæ. *Pistilla* staminibus breviora.

5. *S. hir-*

5. S. *hirsuta*, foliis ovalibus acutè serratis basi rotundatis cordatisve utrinque pilosis; adultis erectis, petiolis longissimis teretiusculis villosis, pedicellis elongatis unifloris.

S. hirsuta. *Linn. Sp. Pl.* 574. *Mill. Dict. n.* 6. *Willd. Sp. Pl.* ii. *p.* 647. *Lapeyr. Fl. Pyren. Saxif. p.* 45. *t.* 23. (*optima.*) *Lam. Encycl.* vi. *p.* 681. *Engl. Bot. t.* 2322. (*bona.*) *Hort. Kew. ed.* 2. 3. *p.* 68. *Lam. et Decand. Flor. Franc.* iv. *p.* 378. *Sternb. Saxif. p.* 14.

Sedum serratum, folio pallido, flore elegantèr punctato. *Moris. Hist.* 3. 12. *t.* 9. *f.* 17.

β. foliis subrotundo-cordatis utrinque glabris.

Habitat in rupibus humidis alpium Pyrenaicarum et Hibernicarum, β cum α in Hiberniâ. *J. T. Mackay.* ♃. (v. v. c.)

Planta cæspitosa. *Radix* fibrosa. *Folia* omnia longè petiolata, erecta, ovalia, coriacea, utrinque pallidè viridia, pilis rigidiusculis adspersa; basi vel rotundata v. cordata; margine serrata: serraturis subdistantibus, triangularibus, acutis. *Petioli* longissimi, erecti, teretiusculi, densè villosi; suprà canaliculati. *Scapi* erecti, palmares aut pedales, flexuosi, villis viscidis tecti. *Panicula* divaricatìm ramosissima. *Pedicelli* elongati, uniflori, calycesque pilis glanduliferis obsiti. *Laciniæ calycinæ* ovatæ, obtusæ, obscurè 3-nerves. *Petala* ovali-oblonga, alba punctis numerosis fulgidis rubris et flavis instructa oculo armato 5-nervia. *Filamenta* alba, pistillis longiora. *Antheræ* rubræ.

This species appears intermediate between *S. Geum* and *umbrosa*; with *Geum* it agrees in the form of its petioles, and in its leaves being cordate at the base; and with *S. umbrosa* in its more oval, smooth, and paler green leaves and larger flowers with bright-coloured spots. From both, however, it appears sufficiently distinct to rank as a species. *Moris. Hist.* 3. 12. *t.* 9. *f.* 17.

given

given as a synonym of *punctata*, certainly belongs to this plant. *Magnol. Hort. Monsp. t.* 87. ought with more propriety to be referred to *S. Geum.*

6. *S. umbrosa*, foliis obovatis retusis cartilagineo-crenatis glaberrimis; adultis confertis patentibus, petiolis brevibus compresso-dilatatis, pedicellis paucifloris.

S. umbrosa. *Sp. Pl.* 574. *Mill. Icon.* 141. *f.* 2. *Willd. Sp. Pl.* ii. *p.* 647. *With. Brit.* 403. *Lapeyr. Pyren. Saxif. p.* 44. *t.* 22. (*bona.*) *Lam. Encycl.* vi. *p.* 680. *Smith Brit.* ii. *p.* 450. *Engl. Bot.* 633. *Hull. Brit.* 92. *Persoon Synop.* i. *p.* 488. *Lam. et Decand. Fl. Franc.* iv. *p.* 378. *Hort. Kew.* iii. *p.* 67. *Sternb. Saxif. p.* 14.

Geum folio subrotundo minori, pistillo floris rubro. *Tournef. Inst.* 251.

β. punctata, foliis subrotundis argutè dentato-serratis; adultis erectis, petiolis longioribus.

S. punctata. *Linn. Sp. Pl.* 574. (exclus. syn. *Moris. Hist.*) *Willd. Sp. Pl.* 2. *p.* 646. (exclus. syn. *Moris. Hist.*)

γ. serratifolia, foliis oblongo-ovatis inciso-serratis; adultis erectis, petiolis longioribus.

S. serratifolia. *Mackay in literis.*

Habitat α in alpibus Pyrenaicis et Hibernicis, *β* et *γ* in Hiberniæ montibus. *D. Mackay.* ♃. (v. v. c.)

Planta cæspitosa. *Radix* fibrosa. *Folia* anni præcedentis persistentia, densè conferta, humi patentia; juniora erecta, brevè petiolata, obovata, retusa, cartilagineo-crenata: crenaturis subimbricatis, utrinque viridia glaberrima. *Petioli* compresso-dilatati, suprà plani, ad marginem villis mollibus tenuitèr ciliati paginâ foliorum vix longiores. *Scapus* erectus, flexuosus, villis viscidis tectus. *Panicula* divaricatìm ramosa. *Pedicelli* breves, pauciflori, calycesque

que pilis brevibus glanduliferis confertè instructi. *Laciniæ calycis* ovatæ, obtusæ, obscurè trinerves. *Petala* ovalia, conspicuè trinervia: nervis ramosis, roseo-alba punctis numerosis coccineis et flavis pulcherrima.

Saxifraga umbrosa is readily distinguished from the two preceding species by its flat, dilatated, and much shorter petioles; by the leaves never being cordate at the base; and lastly, by the serratures being more distinctly cartilaginous at their margins. The variety *β*. I believe to be Linnæus's *S. punctata*: it differs from *α*. by the greater length of its petioles, and by the older leaves being loose, and always erect, never confert and spreading on the ground as in var. *α*; the var. *γ*. is very near akin to *β*, only differing in its leaves being oblong-ovate. They both likewise differ from *α*. by the large and sharp serratures of their leaves. The synonyms of Morison and Miller, quoted by Linnæus, evidently belong to *hirsuta*. The Count de Sternberg, in his excellent monograph of the genus, has described for *S. punctata* the Siberian *S. Geum*, which differs in no respect from the European one, as I have examined excellent specimens of it in the Pallasian Herbarium in the possession of A. B. Lambert, Esq. These specimens agree exactly with Gmelin's figure quoted by him.

7. *S. cuneifolia*, foliis cuneiformibus repando-crenatis glabris; adultis confertis patentibus: petiolis linearibus angustissimis nudis, laciniis calycinis oblongis acutis, petalis spathulatis.

S. cuneifolia. *Linn. Sp. Pl.* 574. *Scop. Carn.* 490. *t.* 13. *Schmied. Fasc. t.* 12. *n.* 37. *Willd. Sp. Pl.* ii. *p.* 647. *Lapeyr. Pyren. Saxif. p.* 45. *Waldst. et Kitaib. Hung.* i. *p.* 43. *t.* 44. (*media.*) *Lam. Encycl.* vi. *p.* 681. *Lam. et Decand. Fl. Franc.* iv. *p.* 377. *Hort. Kew. ed.* 2. 3. *p.* 68. *Sternb. Saxif. p.* 14.

Saxifraga

Saxifraga punctata. *Gunn. Norv. n.* 1076. *Act. Haf.* x. *p.* 445. *t.* 3. *f.* 10.

S. foliis petiolatis obtusis, caule fragili nudo ramoso. *Hall. Helv. n.* 974.

Cotyledon altera olim Matthioli. *Bauh. Hist.* iii. *p.* 684.

Cotyledon aut Sedi species quædam. *Gesn. Fasc.* xix. *t.* 12. *f.* 37. (*bene.*)

β. davurica, foliis opacis dentatis, floribus majoribus.

S. davurica. *Hort. nec Willd.*

Habitat α in alpibus Pyrenæor. Helvetiæ, Styriæ, Hungariæ et Norvegiæ; *β* in Sibiriâ? ♃. (v. v. c.)

Planta cæspitosa, duplò minor. *Radix* fibrosa. *Folia* anni præcedentis persistentia, conferta, humi patentia; juniora erecta, cuneiformia, petiolata, utrinque glaberrima, repando-crenata, rigidè coriacea, basi attenuata. *Petioli* lineares, angustissimi, rigidi, fragiles, nudi, margine cartilaginei. *Scapus* erectus, flexuosus, rigidus, fragilis, villis viscidis rarè adspersus. *Panicula* divaricatìm ramosa: *rami* dichotomi. *Pedicelli* calycesque pilis glandulosis instructi. *Laciniæ calycinæ* oblongæ, acutæ, obscurè uninerves. *Petala* spathulata, basi angustata, puncto luteo, subsolitario instructa, sub microscopio trinervia: nervis ramosiusculis. *Stamina* pistillis ferè duplò longiora; *filamenta* alba; *antheræ* fulvæ.

8. *S. spicata*, foliis longè petiolatis orbiculato-cordatis argutè serratis venosis pilosis, petiolis basi dilatatis, racemo elongato spiciformi, laciniis calycinis brevissimis obtusis.

S. Geum. *Pursh Fl. Amer. Septent.* i. *p.* 311.

Habitat in Insulâ Sledge dictâ ad oras occidentales Americæ septentrionalis. *D. Nelson.* ♃. (v. s. in Herb. Banks.)

Planta

Planta cæspitosa. *Radix* fibrosa. *Folia* omnia erecta longè petiolata, orbiculato-cordata, conspicuè venosa, grossè et acutè serrata, utrinque pilosa ; *petioli* longissimi ; basi dilatati, subtùs striato-nervosi, margine villis mollibus ciliati. *Scapus* pedalis, teres, erectus, villis viscidis tectus. *Racemus* elongatus, apice attenuatus, variè dichotomus, multiflorus. *Pedicelli* brevissimi, numerosi, pube brevi glutinosâ, ut et *calyces*, tecti. *Laciniæ calycinæ* brevissimæ, obtusæ. *Petala* elliptico-oblonga, punctata ? 3-nervia : nervis ramosis flexuosis. *Genitalia* petalis triplò longiora ; *filamenta* longissima, gracilia ; *pistilla* elongata, recta.

The above species is widely different from the *S. Geum*, with which Pursh has confounded it. It is distinguished by its nerved and dilated petioles. The leaves are all erect, broader, orbiculato-cordate, veined and serrated ; their teeth large, acute. *Flowers* on dichotomous peduncles, disposed in a long tapering raceme. The laciniæ of the *calyx* are much shorter and broader. The *stamens* twice the length of those of *S. Geum*, and longer than the petals. The only specimens I have seen of this very distinct plant are preserved in the Banksian Herbarium, and were collected in Sledge Island, on the north-west coast of America, by Mr. David Nelson, a very indefatigable botanist, who accompanied the celebrated Captain Cook in his third voyage, and who has made many interesting discoveries in those regions.

9. *S. Nelsoniana*, foliis orbiculato-cordatis subpeltatis inciso-serratis, petiolis longissimis filiformibus, thyrso ovato.

Habitat ad Caput Newnham dictum, ad oras occidentales Americæ borealis. *David Nelson*. ♃. (v.s. Herb. Banks.)

Planta subcæspitosa. *Radix* fibrosa. *Folia* omnia erecta,

longè

longè petiolata, orbiculato-cordata, subpeltata, coriacea, suprà glabra, subtùs hirsuta, inciso-serrata: serraturis magnis acutis. *Petioli* longissimi filiformes, æquales, undique villosi. *Scapus* palmaris, erectus, simplicissimus, teres, villis longis mollibus undique tectus. *Flores* brevè pedicellati, albi, magnitudine *S. nivalis*, in thyrso ovato terminali densè dispositi. *Laciniæ calycinæ* triangulari-ovatæ, acutæ. *Petala* ovalia, parva, alba, impunctata? *Filamenta* alba. *Pistilla* elongata, recta.

Hanc speciem pulcherrimam et omninò distinctam nomine inventoris peritissimi atque indefessi lubens condecoravi.

10. *S. arguta*, foliis reniformi-rotundatis inciso-serratis glabris, petiolis filiformibus, scapo gracili lævi, laciniis calycinis oblongis acutis.

Habitat ad oras occidentales Americæ septentrionalis. *D. Menzies.* ♃. (v. s. in Herb. Banks.)

Radix fibrosa. *Folia* longè petiolata, reniformi-rotundata, profundè inciso-serrata, utrinque glabra. *Petioli* longissimi, filiformes, graciles. *Scapus* lævis, gracilis. *Panicula* simplicissima. *Flores* albi, magnitudine *S. stellaris*. *Laciniæ calycis* oblongæ, acutæ. *Petala* ovalia, unguiculata, multinervosa, punctata? *Pistilla* brevissima.

11. *S. stellaris*, foliis aggregatis rhombeo-ovatis sessilibus acutè dentatis: basi integerrimis angustatis, petalis ovatis acutis æqualibus unguiculatis, scapo subsimplici.

S. stellaris. *Linn. Sp. Pl.* 572. *Flor. Dan. t.* 23. (*bona.*) *Jacq. Coll.* i. *p.* 202. *t.* 13. (*optima.*) *Scop. Carn.* i. 292. *t.* 13. (*media.*) *Huds. Angl.* 179. *Lightf. Scot.* i. *p.* 220. *With. Brit.* 402. *Willd. Sp. Pl.* ii. *p.* 644. *Engl. Bot. t.* 167.

t. 167. (*bona.*) *Lapeyr. Pyren. Saxif. p.* 490. *Lam. Encycl.* vi. *p.* 680. *Smith Brit.* ii. *p.* 448. *Persoon Synop.* i. *p.* 488. *Lam. et Decand. Fl. Franc.* iv. *p.* 379. *Hort. Kew. ed.* 2. 3. *p.* 68. *Sternb. Saxif. p.* 11. *Wahlenb. Lapp. p.* 114.

S. foliis rhomboideis acutè serratis, caule nudo ramoso. *Hall. Helv. n.* 973.

S. foliis lanceolatis dentato-serratis, caule nudo simplici. *Linn. Suec.* 335, 367.

S. caule nudo simplici, foliis lanceolatis dentatis, petalis acutis. *Linn. Lapp.* 175.

Sanicula Myosotis floribus albicantibus ferè umbellatis. *Pluk. Alm. p.* 331. *ejusd. Phytog. t.* 58. *f.* 2. (*bene.*)

Sedum montanum hirsutum mucronato et dentato folio, flore albo guttato. *Moris. Hist.* iii. *p.* 478. *s.* 12. *t.* 9. *f.* 13. (*bene.*)

Sanicula alpina aliquatenus affinis. *Bauh. Hist.* iii. *p.* 708.

β. *elata*, scapi plures, pedales.

γ. *angustifolia*, foliis angustioribus longioribusque apice paucidentatis.

δ. *Schleicheri*, foliis obovatis repando-crenatis, scapo flexuoso humiliore.

S. stellaris. *Schleicher in literis.*

ε. *Bellardi*, acaulis; foliis subrotundis repandis, flore sessili.

S. Bellardi. *Allion. Pedem. n.* 1536. *t.* 88. *f.* 1. *Willd. Sp. Pl.* ii. *p.* 645. *Sternb. Saxif. p.* 2.

Habitat α Scotiæ et totius Europæ alpium petrosa humida et scaturigines; β et γ in Sibiriâ (*Pallas*); δ in alpibus Helveticis (*Schleicher*); ε in alpibus Pedemontanis (*Bellardi*). ♃. (v. v. α sp. δ cult.; β et γ v. s. in Herb. Pallasio, nunc Lamb.)

Planta in cæspitibus densis parvulis vegetans. *Radix* fibrosa. *Folia* conferta, sessilia, rhombeo-ovata, apice acutè dentata, basi integerrima, angustata, utrinque pilis setosis adspersa; suprà nitida. *Scapus* subnudus, 2—4-pollicaris in β pedalis, villis mollibus viscidis instructus. *Panicula* simplex, pauciflora. *Pedunculi* dichotomi calycesque pilis glandulosis leviter tecti. *Bracteæ* ovatæ, acutæ, integræ. *Laciniæ calycinæ* ovato-acutæ, 3-nerves. *Petala* ovata, acuta, alba, æqualia, unguiculata, elegantissimè 3-nervia (nervis simplicibus rectis); basi maculis 2 aureis instructa: dorso carinata. *Filamenta* alba. *Antheræ* croceæ. *Pistilla* brevissima, crassa.

12. *S. leucanthemifolia*, foliis confertis lanceolato-cuneatis acutè grossèque dentatis, basi integerrimis angustatis, scapo ramosissimo diffuso, petalis ovatis acutis unguiculatis; tribus exterioribus majoribus.

S. leucanthemifolia. *Mich. Amer. Bor.* i. *p.* 268. *Lapeyr. Pyren. Saxif. p.* 49. *t.* 25. *Lam. Encycl.* vi. *p.* 679. *Pursh Amer. Septent.* i. *p.* 311. *Sternb. Saxif. p.* 10.

S. Clusii. *Gouan Illust. p.* 28. (exclus. synon.) *Lam. et Decand. Flor. Franc.* iv. *p.* 380.

Habitat in alpibus Pyrenaicis, et in Americâ boreali. ♃ (v. v. c. et s. sp.)

Planta cæspitosa. *Radix* fibrosa. *Folia* conferta, erecta, lanceolato-cuneata, apice acutè grossèque dentata, basi integerrima, angustata, utrinque pilis setosis instructa. *Scapus* subnudus, 4—6-pollicaris, flexuosus, diffusè ramosissimus, villis viscidis tectus. *Rami* dichotomi. *Pedicelli* elongati, graciles, uniflori, pube brevi glutinosâ vestiti. *Laciniæ calycinæ* ovatæ, obtusæ. *Petala* ovata, acuta,

acuta, inæqualia, unguiculata, triplinervia: nervis ramosis, flexuosis; tria exteriora majora, basi biguttata; duo interiora multò minora, immaculata.

Obs. Præcedente triplò major, in plurimis tamen similis, at notis indicatis abundè diversa.

13. *S. sarmentosa*, stolonibus reptantibus, foliis orbiculato-cordatis latè lobato-crenatis discoloribus pilosis, petalis unguiculatis; duobus exterioribus maximis flaccidis.

S. sarmentosa. *Linn. Suppl. p.* 240. *Thunb. Japon. p.* 182. *Schreb. Monog. Dioneæ, p.* 16. *t.* 2. *f.* 3. (*media.*) *Ait. Hort. Kew. ed.* 1. 2. *p.* 79. *Lam. Encycl.* vi. *p.* 684. *Persoon Synops.* i. *p.* 488.

S. ligulata. *Murr. in Comment. Gött.* 1781. *p.* 26. *t.* 1. *Schkika. Kæmpf. Amœn.* 870. *Jacq. Misc.* ii. *p.* 327. *ejusd. Icon. var.* 1. *t.* 80. (*optima.*)

Habitat in Imperii Japonarum locis montosis et humidis inque lapidosis (*Kæmpfer, Thunberg*); etiam in Chinâ. ♃. (v. v. c.)

Planta cæspitosa, stolonifera. *Radix* fibrosa. *Stolones* axillares, latè reptantes, ad genicula suprà comam parvam foliorum et infrà fibras nonnullas progredientes. *Folia* numerosa, patentia, orbiculato-cordata, longè petiolata, lobato-crenata: crenaturis latissimis obtusis, utrinque pilis setosis adspersa, suprà opacè viridia, fasciis albis; subtùs rubra. *Scapi* palmares, aut pedales, erecti, petiolique pilis rigidiusculis viscidis deflexis undique vestiti. *Panicula* ramosa, laxiflora. *Bracteæ* lanceolatæ, mucronatæ, pedicellique pube glutinosâ obsitæ. *Laciniæ calycinæ* latè ovatæ, obtusæ, conspicuè trinerves. *Petala* unguiculata: unguibus capillaribus; tria interiora parva,

 cordata,

cordata, acuta; horum lateralia basi maculâ flavâ notantur, at centrale punctis duobus puniceis ad basin munitum est; duo exteriora maxima, lanceolata, acuta, flaccida, 3-nervia: nervis flexuosis, ramosis.

14. *S. erosa*, foliis lanceolatis acutis glabris runcinato-serratis, paniculâ divaricatâ pyramidatâ, pedicellis elongatis unifloris, petalis oblongo-ovalibus obtusis unguiculatis.

S. erosa. *Pursh Amer. Boreal.* i. *p.* 311.

β. foliis hirsutis.

Habitat α in rivulis lapidosis montium excelsiorum Carolinæ et Virginiæ. *Pursh.* β in horto Chelseano colitur. ♃. (v. v. c.)

Planta cæspitosa. *Folia* numerosa, erecta, lanceolata, acuta, erosè runcinato-serrata, basi integra in petiolum angustata, utrinque glabra, lucida. *Scapi* stricti, pedales v. sesquipedales, teretes, pilis viscidis patentibus undique tecti. *Panicula* divaricata, ramosa, laxiflora, pyramidata. *Pedicelli* elongati, filiformes, uniflori, calycesque pilis glanduliferis crebrè instructi. *Laciniæ calycis* ovatæ, obtusæ, obscurè uninerves. *Petala* oblongo-ovalia, alba, unguiculata, 3-nervia: nervis simplicibus strictis, puncto flavo solitario ad basin instructa. *Filamenta* alba. *Antheræ* aureæ.

Sectio 3.

§ *Foliis lobatis.*

15. *S. rotundifolia*, foliis reniformibus inæqualitèr grossèque dentatis; caulinis petiolatis, petalis lanceolatis acutis.

S. rotundifolia. *Linn. Sp. Pl.* 576. *Mill. Dict. n.* 5. *ejusd. Icon. t.* 141. (*media.*) *Scop. Carn.* ii. *n.* 488. *Willd. Sp. Pl.* ii. *p.* 651. *Curt. Magaz.* 424. (*bona.*) *Lapeyr. Pyren.*

ren. Saxif. p. 50. *t.* 26. (*optima.*) *Lam. Encycl.* vi. *p.* 688. *Persoon Synop.* i. *p.* 489. *Hort. Kew. ed.* 2. 3. *p.* 69. *Sternb. Saxif. p.* 17.

S. foliis caulinis reniformibus dentatis petiolatis, caule paniculato. *Gmel. Sib.* iv. *p.* 162.

S. foliis reniformibus acutè serratis hirsutis petiolatis, caule ramoso. *Hall. Helv. n.* 975.

S. foliis reniformibus acutè crenatis, caule ramoso folioso. *Hort. Cliff.* 167. *Roy. Lugdb.* 453.

Sanicula montana rotundifolia major. *Bauh. Pin.* 243.

Sanicula alpina. *Cam. Epit.* 764. *Gesn. Fasc.* xix. *t.* 10. *f.* 25.

β. *repanda*, major et robustior, foliis latioribus.

S. repanda. *Sternb. loc. cit. p.* 17. *t.* 5.

S. rotundifolia. *Marsch. à Bieberst. Fl. Taurico-Cauc.* i. *p.* 315. *Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 76.

Habitat α in Austriæ, Helvetiæ et Sibiriæ alpibus; β in alpestribus Caucasicis. ♃. (v. v. α et β c.)

Planta densè cæspitosa. *Radix* fibrosa. *Caules* erecti, rigidi, flexuosi, foliosi, palmares pedalesve. *Folia* radicalia reniformia, longè petiolata, inæqualitèr grossèque dentato-serrata; suprà lucida, pilis setosis adspersa; subtùs pubescentia; caulina petiolata radicalibus conformia nisi magis inæqualitèr et profundiùs dentata: *petioli* semiteretes, undique villosi. *Panicula* divaricata, laxa. *Bracteæ* lineares longitudine pedicellorum. *Pedicelli* calycesque pilis glandulosis tecti. *Calyx* patens; laciniæ oblongæ, obtusiusculæ, obsoletè 3-nerves. *Petala* lanceolata, acuta, alba, punctis minutis coccineis adspersa, 3-nervia: nervis simplicibus. *Filamenta* alba. *Antheræ* pallidæ.

OBS.

Obs. Var. β ex mente Clariss. Steveni ab rotundifoliâ non differt, tamen mihi in hortis semper in omnibus partibus, præter flores, majorem et robustiorem apparuit.

16. *S. hybrida*, foliis radicalibus petiolatis cuneato-rotundatis crenatis; caulinis minutis integris, caule paniculato. *Sternb. Saxif. p.* 17. *t.* 8. *f.* 3.

Habitat in alpibus Pyrenaicis. ♃.

Hanc plantam nec vivam neque siccam vidi. Præcedenti valdè affinis videtur, at modò figura Sternbergii fidenda: abundè discrepat staturâ minori et graciliori; foliis basi acutis nec cordatis; caulinisque minutis, integris, subsessilibus.

17. *S. granulata*, foliis radicalibus reniformibus inciso-lobatis; caulinis petiolatis, laciniis calycinis lanceolatis obtusis, petalis spathulatis.

S. granulata. *Linn. Sp. Pl.* 576. *Huds. Angl.* 182. *Flor. Dan.* 514. *With. Brit.* 405. *Willd. Sp. Pl.* ii. *p.* 651. *Lam. Illust. t.* 372. *f.* 1. (*mala.*) *ejusd. Flor. Franc.* iii. *p.* 532. *Ibid. Encycl.* vi. *p.* 689. *Engl. Bot. t.* 500. (*bona.*) *Smith Brit.* ii. *p.* 453. *Lapeyr. Pyren. Saxif. p.* 52. *Hort. Kew. ed.* 23. *p.* 69. *Sternb. Saxif. p.* 16.

S. foliis caulinis reniformibus obtusè lobatis, caule ramoso, radice granulatâ. *Hort. Cliff.* 167. *Fl. Suec.* 350.

S. foliis radicalibus reniformibus obtusè dentatis, caulinis palmatis. *Hall. Helv. n.* 976.

S. rotundifolia alba. *Bauh. Pin.* 309.

S. alba. *Dod. Pempt.* 316.

Sedum rotundifolium erectum, radice granulatâ. *Moris. Hist.* iii. *p.* 474. § 11. *t.* 9. *f.* 23. (*bona.*)

β. floribus plenis.

γ. mul-

γ. *multicaulis*, caulibus pluribus brevioribus, foliis circinato-incisis.

S. granulata, β. multicaulis. *Lapeyr. loc. cit. t.* 27.

Habitat α in apricis et nemoribus Europæ borealis et meridionalis, ubique obvia; β in hortis colitur; γ in alpibus Pyrenaicis. *Lapeyrouse.* ♃. (v. v. sp.)

Radix granulata. *Caules* erecti, 4—6-unciales pedalesve, ramosi, foliosi, multiflori, villis mollibus viscidis crebrè obsiti. *Folia* radicalia petiolata, reniformia, inciso-lobata, utrinque hirsuta: petiolis villosis; caulina petiolata, palmata. *Bracteæ* lanceolatæ, obtusæ. *Pedicelli* elongati, uniflori, calycesque pube glutinosâ instructi. *Flores* magni, campanulati, candidi. *Laciniæ calycinæ* lanceolatæ, obtusæ, 3-nerves. *Petala* spathulata, triplinervia: nervis ramosis flexuosis.

18. *S. bulbifera*, foliis radicalibus reniformibus petiolatis crenatis; caulinis sessilibus inciso-lobatis, laciniis calycinis triangulari-ovatis acutis, caule ramoso multifloro.

S. bulbifera. *Linn. Sp. Pl.* 577. *Willd. Sp. Pl.* ii. *p.* 651. (exclus. synon. *Gunn. Norv. et Flor. Dan.*) *Lam. Encycl.* vi. *p.* 690. (exclus. synon. *Gunn. Norv. et Flor. Dan.*) *Persoon Synop.* i. *p.* 489. *Lam. et Decand. Fl. Franc.* iv. *p.* 369. *Sternb. Saxif. p.* 15. *t.* 12. *f.* 1. (*bona.*)

Sedum rotundifolium erectum soboliferum. *Moris. Hist.* iii. *p.* 474. § 12. *t.* 9. *f.* 24. (*optima.*)

Sedum ad folia bulbos gerens. *Bauh. Pin.* 309. *Col. Ecphr.* i. *p.* 318. *t.* 317. (*bona.*)

Habitat in Europæ australis pratis saxosis et umbrosis, in Hispaniâ (*Pavon*). ♃. (v. s. in Herb Banks. et Lamb.)

Radix

Radix granulata. *Caules* erecti, palmares v. pedales, teretes, ramosi, multiflori, pilis viscidis instructi. *Folia* radicalia reniformia, obtusè crenata, utrinque pilosa, longè petiolata: petiolis villis viscidis confertè tectis; caulina omnia sessilia, inferiora inciso-dentata, superiora ovato-oblonga, integra, in axillis bulbos gerentia. *Pedunculi* elongati, uniflori calycesque pube glutinosâ tecti. *Flores* candidi præcedente minores. *Laciniæ calycis* triangulari-ovatæ, acutæ. *Petala* spathulata, triplinervia: nervis flexuosis ramosissimis.

This is undoubtedly the true Linnæan *S. bulbifera*, which is confined to the southern parts of Europe. It is therefore remarkable, that so accurate an observer as Wahlenberg should have described it as a Lapland plant, nearly related to *cernua*, if really specifically distinct from that species, which indeed I am rather inclined to doubt. The figure of *Flora Danica*, quoted by Willdenow and others, belongs evidently to *S. cernua*.

19. *S. cernua*, foliis glabris petiolatis; radicalibus reniformibus inciso-lobatis; caulinis palmatis, laciniis calycinis ovatis obtusis, petalis spathulatis emarginatis, caule simplicissimo subunifloro.

S. cernua. *Linn. Sp. Pl.* 577. *Flor. Dan. t.* 22. (*mala.*) *Gunn. Norv. n.* 528. *t.* 9. *f.* 2. (*bona.*) *Willd. Sp. Pl.* ii. *p.* 552. *With. Brit.* 405. *Lapeyr. Pyren. Saxif. p.* 52. *Lam. Encycl.* vi. *p.* 690. *Smith Brit.* ii. *p.* 453. *Engl. Bot. t.* 664. (*bona.*) *Persoon Synop.* i. *p.* 489. *Wahlenb. Lapp.* 116. *Sternb. Saxif. p.* 18. *t.* 12. *f.* 2.

S. foliis palmatis, caule simplici unifloro. *Linn. Fl. Lapp.* 172 *t.* 2. *f.* 4. (*bona.*) *Hort. Cliff.* 167. *Fl. Suec.* 351. 373.

β. caule

β. caule subramoso paucifloro.

Fl. Dan. t. 390. S. bulbifera. *Wahlenb. Lapp.* 116?

Habitat in summis alpibus Lapponicis, Pyrenaic., Helvetic., Scotic.; *β* in Lapponiæ? et Norvegiæ alpibus, nec non in Sibiriâ (*Pallas*). ♃. (v. v. *α*; *β* s. in Herb. Pallas. nunc Lamb.)

Radix squamata; squamæ carnosæ e basibus petiolor. foliorum primordialium enatæ. *Caulis* erectus, 4—6-uncialis, simplicissimus, flexuosus, foliosus, læviusculus, pilis raris brevibus adspersus. *Folia* radicalia petiolata, reniformia, glabra, inciso-lobata: lobis ovatis acutis; caulina petiolata, glabra; inferiora palmata; superiora indivisa, ovata, ad axillas bulbis parvis aggregatis instructa. *Flos* solitarius, terminalis, magnus, campanulatus, candidus, nutans. *Pedicellus* brevis, pilis brevibus viscidis, ut et calyx, levitèr adspersus. *Laciniæ calycinæ* ovatæ, obtusæ. *Petala* spathulata, triplinervia: nervis flexuosis ramosissimis.

20. S. *Sibirica*, foliis hirsutis petiolatis; radicalibus reniformibus palmatis; caulinis digitatis, pedicellis elongatis remotis, petalis obovatis: nervis simplicibus, caule filiformi ramoso.

S. Sibirica. *Linn. Sp. Pl.* 577. *Willd. Sp. Pl.* ii. *p.* 653. *Lam. Encycl.* vi. *p.* 693. *Persoon Synop.* i. *p.* 489. *Sternb. Saxif. p.* 23. *t.* 25.

S. foliis reniformibus acutis digitatis, caule ramoso folioso. *Gmel. Sib.* iv. *p.* 162. *n.* 74.

S. granulata. *Steven. de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 77. *n.* 3? (exclus. synon.) *Marsch. Fl. Taur. Cauc.* i. *p.* 315? (exclus. synon.)

S. grandiflora. *Sternb. Saxif. t.* 12. *f.* 4?

 S. cym-

S. cymbalaria. *Marsch. à Bieb. Suppl. Fl. Taur. Cauc. p.* 292? (exclus. synon. *Willd.*)

Habitat in Sibiriâ (*Gmelin, Pallas*), in alpium Caucasicarum saxosis præruptis? *Steven, Marschall à Bieberstein.* ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Radix squamata, fibras numerosas emittens, rudimentis foliorum emarcidorum supernè instructa. *Caules* filiformes, graciles, 4—5-pollicares, ramosi, adscendentes, foliosi, villis viscidis levitèr instructi. *Folia* radicalia longè petiolata reniformia, lobato-palmata: lobis ovatis acutis, utrinque hirsuta; caulina digitata, inferiora petiolata, superiora sessilia. *Petioli* graciles, omnes villosi. *Pedicelli* remoti, elongati, capillares, uniflori, calycesque levitèr pubescentes. *Laciniæ calycinæ* ovatæ, obtusiusculæ. *Petala* obovata, alba, triplinervia: nervis rectiusculis, simplicibus.

The above description was taken from specimens in the Pallasian Herbarium, in the possession of A. B. Lambert, Esq. *Sternb. t.* 25. corresponds exactly with these specimens; but the leaves of the latter are more deeply lobed than represented in the figure. The *S. grandiflora* Sternb. t. 12. f. 4., which is the *granulata* of Steven, and the *S. cymbalaria* of Marschall's *Flora Taurica*, I am inclined to think belongs also to this plant; but having never seen specimens of it, I am unable to decide. The roots of this section, whether scaly or fibrous, scarcely afford any specific character, as they have all a tendency to become scaly.

21. *S. nudicaulis*, foliis reniformibus palmatis glabris, floribus paniculatis, laciniis calycinis acutis, scapo nudo.

Habitat ad oras occidentales Americæ borealis. *David Nelson.* ♃. (v. s. in Herb. Banks.)

Radix

Radix fibrosa. *Scapi* erecti, nudi, 4—5-pollicares, teretes, glabriusculi. *Folia* radicalia reniformia, petiolata petiolis glabris, lobato-digitata, utrinque glabra: lobis ovatis mucronatis. *Flores* paniculati, magnitudine *S. rivularis*, albi. *Pedicelli* calycesque pilis glandulosis levitèr obsiti. *Laciniæ calycinæ* triangulari-ovatæ, acutæ. *Petala* parva, obovata, calyce longiora, triplinervia: nervis rectiusculis, simplicibus. *Filamenta* gracilia stylos æquantia.

22. *S. bracteata*, foliis radicalibus caulinisque longè petiolatis reniformibus inciso-lobatis, floribus congesto-corymbosis bracteatis.

Habitat in Sibiriâ orientali. *D. Merk.* ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Planta cæspitosa. *Radix* fibrosa. *Caules* adscendentes, flexuosi, foliosi, teretes, ramosi, villis viscidis tecti, 3—5-unciales. *Folia* radicalia reniformia, lobato-crenata: lobis obtusis latis, utrinque nudiuscula, longè petiolata; caulina longè petiolata inciso-lobata. *Petioli* basi dilatati villis longis tecti. *Flores* congesto-corymbosi, bracteati, albi, illis *S. cernuæ* paulò majores. *Bracteæ* numerosæ, latissimæ, indivisæ. *Pedicelli* calycesque pilis glandulosis suppediti. *Laciniæ calycinæ* latè ovatæ, obtusæ, obscurè trinerves. *Petala* obovata, alba, calyce paulo longiora, triplinervia: nervis simplicibus, rectiusculis.

23. *S. rivularis*, caule debili simplicissimo, foliis reniformibus longè petiolatis glabris, floribus subternis sessilibus bracteatis.

S. rivularis. *Linn. Sp. Pl.* 577. *Fl. Lapp. n.* 174. *t.* 2. *f.* 7. (*bona.*) *Fl. Dan.* 118. *Gunn. Norv. n.* 479. *Gmel. Sib.* iv. *p.* 170. *Willd. Sp. Pl.* ii. *p.* 652. *Lam. Encycl.* vi. *p.* 690.

 Smith

Smith Brit. ii. *p.* 454. *Engl. Bot. t.* 2275. (*optima.*) *Wahlenb. Lapp. p.* 117. *Pursh Fl. Amer. Septent.* i. *p.* 312. *Sternb. Saxif. p.* 19. *t.* 12. *f.* 3.

Habitat in Europæ summis alpibus, nempè in Lapponiâ (*Linn.*, *Wahlenberg*), in Norvegiâ (*Gunner*), in Sibiriâ (*Gmelin*), in cacumine alpis Ben Lawers dicti Scotiæ (*Dickson*, *G. Don*). ⊙. (v. v.)

Planta annua, lætè virens, debilis. *Radix* fibrosa. *Caules* adscendentes, gracillimi, bipollicares, oligophylli, supernè villis viscidis instructi. *Folia* omnia reniformia, longè petiolata, utrinque petiolisque glabra, 5—6-lobata: lobis ovato-rotundatis obtusissimis. *Flores* terminales, subterni, sessiles, parvi, albi, bracteati. *Bracteæ* subovatæ, obtusæ, trifidæ vel indivisæ, sessiles, ad basin florum insidentes et illos æquantes. *Laciniæ calycinæ* ovatæ, obtusissimæ, rectæ, conniventes. *Petala* ovalia, obtusa, triplinervia, subdistantia, calycem parùm superantia. *Stamina* petalis breviora.

24. *S. nutans*, caule unifolio, racemo nutante paucifloro, laciniis calycinis lanceolatis acutis.

Habitat ad oras occidentales Americæ septentrionalis insulam Unalaska dictam. *David Nelson.* ♃. (v. s. in Herb. Banks.)

Planta cæspitosa. *Radix* fibrosa, rudimentis foliorum emarcidorum suprà tecta. *Caules* erecti, 3—4-unciales, teretes, parcè pubescentes, basi decumbentes, medio geniculati, folio unico instructi. *Folia* radicalia longè petiolata, reniformia, grossè inciso-dentata, utrinque pilis rigidis brevibus adspersa: petiolis hirsutis, latissimè membranaceo-dilatatis; caulinum solitarium, petiolatum, conforme.

forme. *Flores* racemosi, candidi, magnitudine *S. bulbiferæ. Racemus* nutans, 4—5-florus. *Pedicelli* breves calycesque pilis glanduliferis confertè obsiti. *Laciniæ calycinæ* lanceolatæ, acutæ, sub oculis armatis trinerves. *Petala* obovata, triplinervia: nervis flexuosis, ramosissimis.

25. *S. orientalis*, foliis radicalibus rotundatis; caulinis cuneatis acutè grossèque dentatis, laciniis calycinis ovatis acutis, petalis ovalibus: nervis simplicibus.

S. orientalis. *Jacq. Obs.* ii. *p.* 9. *t.* 34. (*optima.*) *Willd. Sp. Pl.* ii. *p.* 658. (exclus. synon. *Tournef.*) *Lam. Encycl.* vi. *p.* 700. *Persoon Synop.* i. *p.* 489. *Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 78.

S. reticulata. *Sternb. Saxif. p.* 21. *t.* 13. S. paradoxa. *ejusd. p.* 22. *t.* 14?

Habitat in Oriente. ⊙. (v. s. in Herb. Banks. et Lamb.)

Planta annua. *Radix* gracilis, fibrosa. *Caules* erectiusculi, ramosi, flexuosi, læviusculi, basi decumbentes, foliosi. *Folia* radicalia rotundata, longè petiolata, basi nunquam cordata, grossè æqualitèr dentata: dentibus magnis ovatis, acutis, utrinque glabra, lucida, venis nigrescentibus reticulata; caulina cuneata, petiolata, basi acuta, apice acutè 5-loba; floralia subopposita, lanceolata, acuta, integerrima, vix petiolata. *Petioli* graciles, filiformes, parcè glandulosi. *Pedunculi* longissimi, capillares, uniflori, calycesque pilis brevissimis glandulosis levitèr adspersi. *Laciniæ calycinæ* brevè ovatæ, acutæ, obscurè trinerves. *Petala* ovalia, sessilia, aurea, calyce duplò longiora, triplinervia: nervis simplicibus rectiusculis.

26. *S. cym-*

26. *S. cymbalaria*, foliis inferioribus reniformibus longissimè petiolatis obtusissimè 5-lobis; summis trilobis indivisisve, laciniis calycinis oblongis obtusis, petalis ovatis acutis: nervis ramosis.

S. cymbalaria. *Linn. Sp. Pl.* 579. *Smith Prod. Fl. Græc.* i. *p.* 277. *Fl. Græc. Icon. ined.* 378.

S. hederacea. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 317. (exclus. synon.)

S. exigua foliis cymbalariæ. *Buxb. Cent.* ii. *p.* 40. *t.* 45. *f.* 2. (*mala.*)

Geum orientale rotundifolium supinum, flore aureo. *Tournef. Cor.* 18.

Habitat in Oriente (*Tournefort, Buxbaum*), in Parnasso, Delphi, aliisque Græciæ montibus (*Sibthorp*). ⊙. (v. s. in Herb. Banks.)

Planta annua, debilis. *Radix* tenuissimè fibrosa. *Caules* numerosi, foliosi, gracillimi, ramosissimi, flexuosi, flaccidi, pilis glanduliferis lævissimè adspersi. *Folia* inferiora longissimè petiolata (petiolis capillaribus), reniformia, subpeltata, leviter 5-loba: lobis rotundatis, utrinque glaberrima, suprà nitida et venis tenuissimis reticulata; summa brevè petiolata, triloba v. indivisa. *Pedicelli* longissimi, capillares, oppositifolii, uniflori, calycesque læviusculi. *Flores* parvi, aurei. *Laciniæ calycis* oblongæ, obtusæ, reflexæ, conspicuè trinerves. *Petala* ovata, acuta, trinervia (nervis ramosis flexuosis), basi rotundata, brevissimè unguiculata, bipunctata.

27. *S. hederacea*, foliis inferioribus acutè trilobis; summis ovatis integris, laciniis calycinis ovatis acutis, petalis subrotundis unguiculatis.

S. hede-

S. hederacea. *Linn. Sp. Pl.* 579. *Willd. Sp. Pl.* ii. *p.* 658. *Persoon Synop.* i. *p.* 489. *Smith Prodr. Fl. Græc.* i. *p.* 278. *Fl. Græc. Icon. ined.* 379.

S. cretica annua minima, hederaceo folio. *Tournef. Cor.* 18.

Habitat in Cretâ (*Tournefort*), in rupibus humidis umbrosis Cretæ et Cypri (*Sibthorp*). ⊙. (v. s. in Herb. Banks.)

Planta exigua, annua. *Radix* capillaceo-fibrosa. *Caules* plures, filiformes, flaccidi, ramosissimi, pilis brevissimis glanduliferis levitèr adspersi. *Folia* inferiora subovata, breviùs petiolata, triloba: lobis brevè ovatis, acutis, utrinque glaberrima, nitida, venis tenuissimis reticulata; summa integra, ovata, acuta. *Pedicelli* elongati, capillares, uniflori, parcè glandulosi. *Flores* parvi, albi. *Laciniæ calycinæ* erectæ, brevè ovatæ, acutæ, trinerves. *Petala* subrotunda, unguiculata, trinervia: nervis ramosis, flexuosis. *Capsula* semi-infera.

Much confusion has hitherto prevailed respecting the three preceding species. Sir James Edward Smith appears to be the only botanist who has examined, or even understood, the *S. cymbalaria* and *hederacea* of Linnæus; the characters of these he has very considerably amended in his admirable *Prodromus Floræ Græcæ*. The *S. orientalis* of Jacquin and Willdenow, given by him as a synonym of *S. cymbalaria*, is a very distinct plant. All three have a general affinity together; but their characters are abundantly distinct. The above descriptions of *S. cymbalaria* and *hederacea* were taken from authentic specimens preserved in the Banksian Herbarium, and were collected by the late Dr. Sibthorp during his travels in Greece*.

* Specimens of *Saxifraga hederacea*, gathered lately in Crete by Dr. Sieber of Prague, are now in the Lambertian Herbarium.

§. *Foliis*

§. *Foliis indivisis.*

28. *S. Hirculus,* foliis lanceolatis obtusis nudis, laciniis calycinis lanceolatis obtusis, petalis spathulatis multinervibus.

S. Hirculus. *Linn. Sp. Pl.* 576. *Fl. Dan. t.* 200. *Huds. Angl.* 181. *Hoffm. Germ.* 144. *Roth. Germ.* i. 184. ii. 468. *With. Brit.* 404. *Willd. Sp. Pl.* ii. *p.* 649. *Lam. Encycl.* vi. *p.* 686. *Smith Brit.* ii. *p.* 451. *Engl. Bot. t.* 1009. (*optima.*) *Persoon Synop.* i. *p.* 489. *Sternb. Saxif. p.* 29.

S. flava. *Lam. Fl. Franc.* iii. *p.* 529.

S. foliis caulinis lanceolatis alternis nudis inermibus, caule erecto. *Linn. Suec.* ii. *n.* 370. *Gmelin Sib.* iv. *p.* 165. *t.* 65. *f.* 3. (*bona.*)

S. petalis latissimis luteis lineatis. *Hall. Helv.* 399. *t.* 8.

Sedum palustre nardi celticæ foliis, flore luteo. *Moris. Hist.* iii. *p.* 477. § 12. *t.* 8. *f.* 5.

Sedum angustifolium autumnale, flore luteo guttato. *Ibid. f.* 6.

Geum angustifolium autumnale, flore luteo guttato. *Dill. in Raii Synop.* 355.

Chamæcistus frisicus, foliis nardi celticæ. *Bauh. Pin.* 466.

Chamæcistus frisicus. *Ger. Em.* 1284.

β. caule pedali multifloro, pedunculis villosissimis.

Habitat α in Suecia, Helvetiæ, Lapponiæ, Sibiriæ, Germaniæ et Angliæ paludibus turfosis; β in Sibiriâ orientali (*Merk*). ♃. (α v. v. c. β v. s in Herb. Pallas. nunc Lamb.)

Planta cæspitosa, pulchra, lætè-virens, glabra, surculosa. *Radix* fibris longis nigris composita. *Surculi* numerosi, foliosi, procumbentes, glaberrimi. *Caules* erecti, 4—6-unciales rarissimè pedales, foliosi, glabri, pauci rariùs multiflori.

multiflori. *Folia* alterna, lanceolata, obtusa, integerrima, utrinque glabra, basi in petiolum angustata. *Pedunculi* longi, stricti, uniflori, villis fuscis glutinosis confertè tecti. *Flores* magni, speciosi, aurei. *Laciniæ calycinæ* lanceolatæ, obtusæ, ciliatæ, conspicuè 5-nerves: nervis simplicibus, marginalibus parallelis, approximatis, medio a cæteris remoto. *Petala* spathulata, aurea, multinervia, apice retusa, punctis croceis instructa, basi brevissimè unguiculata, intus ad basin lacunâ oblongâ nectariferâ ex rimâ bivalvi apicibus acutis munita: nervis rectis, simplicibus, basi junctis. *Filamenta* lutea. *Antheræ* croceæ.

29. *S. myosotifolia*, flagellis nullis, foliis ovatis acutis muticis setosis, caule nudiusculo trifloro, laciniis calycinis latè ovatis, petalis subrotundis unguiculatis.

Habitat in Sibiriâ. *Pallas.* ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Planta patens, cæspitosa. *Radix* lignosa fibris numerosis instructa. *Surculi* brevissimi, erecti, conferti. *Caules* subnudi, erecti, biunciales, fragiles, 2—3-flori, pilis setosis undique obsiti. *Folia* conferta, patentia, ovata, acuta, mutica, pilis setosis ad marginem ciliata et utrinque adspersa, basi in petiolum brevem angustata. *Pedunculi* elongati, uniflori, calycesque pilis glanduliferis crebrè tecti. *Flores* ochroleuci. *Laciniæ calycis* latè-ovatæ, acutæ, muticæ. *Petala* subrotunda, unguiculata, 5-nervia; nervis simplicibus. *Filamenta* compressa, lutescentia, longitudine petalorum. *Antheræ* flavæ. *Styli* breves, crassi.

30. *S. flagellaris*, flagellis axillaribus capillaribus, foliis obovato-spathulatis aristatis cartilagineo-ciliatis, laciniis calycinis

nis lanceolatis, petalis obovatis sessilibus, caule folioso 1—3-floro.

S. flagellaris. *Sternb. Saxif. p. 25. t. 6. (media.) Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p. 79. Marsch. à Bieberst. Suppl. Fl. Taur. Cauc. p.* 291.

S. setigera. *Pursh Amer. Septent.* i. *p.* 312.

S. aspera. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 314. (exclus. synon.)

Habitat in alpibus Caucasicis (*Adams*), ad Caput Newnham dictum ad oras occidentales Americæ borealis (*David Nelson*), in Insulâ Melville dictâ in sinu maris Grœnlandici, Baffin's Bay Anglicè dicto (*Sabine, Fisher*). ♃. (v. s.)

Planta cæspitosa, flagellifera. *Flagelli* e axillis foliorum enati, longissimi, capillares, nudi, patentes, ad apices comâ parvâ foliatâ instructi. *Caules* erecti, simplicissimi, sesqui- bi-pollicaresve, foliosi, 1—3-flori, pilis glandulosis instructi. *Folia* radicalia, conferta, patentia, impetiolata, spathulata, utrinque nuda, margine spinulis cartilagineis ciliata, apice calloso-aristata; caulina alterna, obovata. *Pedicelli* brevissimi, uniflori, calycesque pube glutinosâ tecti. *Flores* aurei magnitudine *S. Hirculi. Laciniæ calycinæ* lanceolatæ, acutæ, extus setosæ. *Petala* sessilia, obovata, multinervia: nervis parallelis apice dichotomis.

This singular species was first discovered by Mr. David Nelson, in Captain Cook's third voyage, at Cape Newnham on the north-west coast of America, from whence the specimens in the Banksian Herbarium were brought. It has since been found on the Caucasian alps; and in the late polar expedition it has been observed in great plenty on the newly-discovered island named Melville

Melville Island. For specimens from thence I am indebted to the kindness of Joseph Sabine, Esq. Pursh is wrong in stating the flowers to be small and white. The *S. myosotifolia*, which agrees with it in general habit, has numerous erect, short and leafy shoots. Leaves ovate, somewhat acute, awnless, ciliated, and slightly clothed on both sides with stiff bristly hairs. The stem is almost leafless. Peduncles long, erect. The *laciniæ* of the calyx short, triangular-ovate. Petals round, cream-coloured, furnished with a claw, and five straight, simple nerves. The flowers are smaller, and the plant is wholly destitute of the naked filiform *sarmenta* so remarkable in *S. flagellaris*.

31. *S. aizoides*, foliis linearibus mucronatis glabris spinuloso-ciliatis, laciniis calycinis latè ovatis, petalis lanceolato-oblongis trinervibus.

S. aizoides. *Linn. Sp. Pl.* 576. *With. Brit.* 404. *Smith Brit.* ii. *p.* 452. *Engl. Bot. t.* 39. (*optima.*) *Lam. Encycl.* vi. *p.* 687. *Sternb. Saxif. p.* 25. *t.* 8. *f.* 1. *Lam. et Decand. Fl. Franc.* iv. *p.* 377. *Wahlenb. Lapp. p.* 115. *ejusd. Carpath.* 117.

S. autumnalis. *Linn. Sp. Pl.* 575. *Huds. Angl.* 180. *Mill. Dict. n.* 10. *Fl. Dan. t.* 72. *Lightf. Scot.* i. *p.* 222. *Scop. Carn.* i. 293. *t.* 14. *Willd. Sp. Pl.* ii. *p.* 650.

S. foliis linearibus sparsis glabris. *Fl. Suec.* 357. 371.

S. foliis subulatis sparsis. *Fl. Lapp.* 178.

S. foliorum margine ciliari, floribus luteis maculosis. *Hall. Helv.* 399.

S. angustifolia autumnalis, flore luteo guttato, foliis florum magis acuminatis. *Breyn. Cent.* 106. *t.* 48.

S. alpina angustifolia, flore luteo guttato. *Raii Synop.* 353.

Sedum alpinum, flore pallido. *Bauh. Pin.* 284. *Moris. Hist.* iii. *p.* 477. *s.* 12. *t.* 6. *f.* 3.

Sedum minus IV. *Clus. Hist.* ii. *p.* 60.
Sedum alpinum primum. *Clus. Pann.* 485. *Ger. Em.* 516.
Habitat in alpium Helvetiæ, Lapponiæ, Styriæ, Angliæ et Scotiæ rupibus et petrosis humidis copiosissimè. ♃. (v. v. sp.)

Planta virens, in cæspitibus planis vegetans. *Radix* fibrosa. *Surculi* numerosi, procumbentes, densè foliosi. *Caules* erecti 2- rariùs 3-pollicares, foliosi, teretes, multiflori, pube viscidâ tecti. *Folia* alterna, linearia, patentia, utrinque glaberrima, lucida, apice cartilagineo-mucronata margine spinuloso-ciliata. *Pedunculi* breves, uniflori, pube glutinosâ vestiti, in æstivatione decurvati. *Flores* subracemosi, flavi. *Laciniæ calycinæ* latè ovatæ, obtusæ, margine membranâ tenui sæpiùs ad apicem parùm laceratâ cinctæ. *Petala* patentia, lanceolato-oblonga, calycem superantia, punctis croceis instructa, triplinervia: nervis simplicibus rectis.

I have followed Wahlenberg in uniting the *S. aizoides* and *autumnalis* of Linnæus. The Lapland and Swedish plant differs in no respect from ours, and the leaves are but rarely naked at their margins. We sometimes meet however with such in seedling plants and others before the flowering season.

32. *S. bronchialis*, foliis confertis lineari-subulatis triquetris mucronatis spinulis cartilagineis ciliatis, laciniis calycinis ovatis, petalis oblongis, caule oligophyllo multifloro.
S. bronchialis. *Linn. Sp. Pl.* 572. *Willd. Sp. Pl.* ii. *p.* 644. *Lam. Encycl.* vi. *p.* 679.
S. foliis imbricatis subulatis ciliatis spinosis, caule subnudo multifloro. *Gmel. Sib.* iv. *p.* 164. *t.* 65. *f.* 2. (*bona.*)

β. lenensis,

β. *lenensis*, surculis brevioribus, foliis longioribus patentibus longè mucronatis, paniculâ majore patente fastigiatâ.

Habitat α in Sibiriâ (*Gmelin*), in Sibiriâ orientali (*Merk*), ad oras occidentales Americæ borealis (*Nelson*); β ad flumen Sibiricum Lenam (*Billings*). ♄. (v. s. in Herb. Banks. et Lamb.)

Planta suffrutescens. *Radix* lignosa, ramosa, fibris pluribus longis instructa. *Surculi* plures, erecti, lignosi, ramosi, crebrè foliosi, basi rudimentis foliorum emarcidorum tecti. *Caules* digitales rariùs palmares, flexuosi, rigidi, fragiles, oligophylli, glabri. *Folia* crebra, imbricata, lineari-subulata, triquetra, rigida, glabra, margine spinulis cartilagineis albis ciliata, apice mucrone calloso instructa; caulina pauca, parva, adpressa, linearia, longe-mucronata versus apicem caulis sensìm minora. *Panicula* parva, multiflora. *Pedicelli* dichotomi calycesque levissimè glandulosi. *Flores* parvi, ochroleuci. *Laciniæ calycis* breves, latè ovatæ, mucronulatæ *Petala* oblonga, sessilia, punctis numerosis minutis croceis instructa, conspicuè triplinervia: nervis simplicibus. *Filamenta* gracilia, lutea. *Antheræ* croceæ.

33. S. *tenella*, foliis confertis lineari-subulatis planis pungentibus ciliatis, caule gracili oligophyllo paucifloro, laciniis calycinis lineari-lanceolatis, petalis obovatis.

S. tenella. *Wulfen in Jacq. Collect.* iii. *p.* 144. *t.* 17. (*bona.*) *Willd. Sp. Pl.* ii. *p.* 643. *Lam. Encycl.* vi. *p.* 678. *Persoon Synop.* i. *p.* 488. *Sternb. Saxif. p.* 30.

S. nitida. *ejusd. t.* 10. *f.* 4?

Habitat in Carinthiæ alpibus. *Wulfen.* ♃.

Planta suffrutescens? cæspitosa. *Radix* fibrosa. *Surculi* numerosi,

numerosi, basi decumbentes et rudimentis foliorum emarcidorum tecti. *Caules* plures, erecti, sesqui- v. bi-unciales, gracillimi, læves, oligophylli, pauciflori. *Folia* conferta, imbricata, lineari-subulata, saturatè viridia, suprà plana, subtùs carinata, utrinque glabra, nitida, apice spinulâ corneâ aciculari terminata, margine ciliata; caulina adperssa, sparsè remota, parva, plana, aristata. *Pedunculi* terni, longi, capillares, uniflori, ferè in racemulum dispositi, calycesque pilis brevissimis glanduliferis levitèr suppediti. *Laciniæ calycis* lineari-lanceolatæ, aristatæ. *Petala* obovata, alba, immaculata, calycem superantia, obscurè triplinervia. *Filamenta* gracilia, alba. *Antheræ* flavæ.

Præcedenti affinis; sed triplò minor et gracilior, atque notis indicatis diversa. *S. nitida* Clariss. Sternbergi vix ullo dubio huic pertinet, figura ejus quæ ad siccam facta est omninò mala, et hìnc colorem luteum floribus attribuet.

34. *S. brachypoda*, foliis linearibus planis pungentibus trinervibus margine spinulosis, flore terminali solitario brevèpedunculato, petalis obovatis.

Habitat in Nepaliæ alpibus. *Wallich.* ♃. (v. s. in Herb. Lamb.)

Radix fibrosa. *Caules* plures, adscendentes, simplicissimi, foliosi, pilis setosis undique tecti. *Folia* alterna, linearia, plana, glabra, trinervia, suprà nitida, subtùs glauca, apice spinulâ aciculari terminata, margine spinulis armata, basi subamplexicaulia. *Flos* aureus, terminalis, solitarius, brevè-pedunculatus, magnitudine *S. asperæ*. *Calyx* et pedunculus pilis setosis patentibus glanduliferis confertè obsiti: laciniæ ovatæ, mucronatæ, conspicuè trinerves,

margine

margine spinulis ciliatæ. *Petala* obovata, calyce longiora, triplinervia: nervis simplicibus rectis. *Stamina* pistillis vix longiora; *filamenta* flava; *antheræ* croceæ.

35. *S. juniperina*, caulibus suffruticosis proliferis, foliis interruptè confertissimis subulato-triquetris rigidis pungentibus, floribus spicatis, petalis obovatis.

S. juniperina. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 314. *Ibid. Supplem. p.* 291. *Sternb. Saxif. p.* 31. *t.* 10. (*media.*) *Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 79.

Habitat in alpibus Caucasicis (*Pallas*), in Caucasi rupium fissuris, circa portas Caucasicas et ad radices alpis Kaischaur frequens (*Marschall à Bieberstein*). ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Planta suffrutescens. *Radix* lignosa fibris numerosis crassiusculis instructa. *Caules* numerosi, digitales, erecti, rigidissimi, confertè foliosi, apice prolifero-ramosi, basi rudimentis foliorum emarcidorum vestiti. *Folia* interruptè confertissima, subulata, subtriquetra, rigida, glabra, suprà planiuscula, bisulcata, subtùs carinâ planiusculâ, apice spinâ aciculari instructa, basi tenuissimè serrulata. *Spica* terminalis, brevis, brevè-pedunculata, 6—10-flora. *Pedicelli* recti, brevissimi, pube glutinosâ densè obsiti. *Bracteæ* lineares, obtusæ, glandulis ciliatæ. *Flores* lutei magnitudine *S. asperæ*. *Laciniæ calycis* ovato-oblongæ, mucronatæ, trinerves, ciliatæ. *Petala* obovata, triplinervia, calyce longiora.

36. *S. aspera*, foliis planis lineari-lanceolatis pungentibus spinulis ciliatis, petalis obovatis: nervis ramosis, caule ramoso.

S. aspera. *Linn. Sp. Pl.* 575. *Ger. Prov.* 423. *Jacq. Aust.*

Aust. v. *p.* 44. *t. app.* 31. (*bona.*) *Mill. Dict. n.* 14. *Willd. Sp. Pl.* ii. *p.* 649. *Lapeyr. Pyren. Saxif. p.* 36. *Lam.* vi. *p.* 678. *Persoon Synop.* i. *p.* 489. *Sternb. Saxif. p.* 29.

S. foliis simplicibus ciliatis, caule ramoso. *Hall. Helv.* 403.

S. sedi foliis crenatis asperis. *Scheuch. It.* ii. *p.* 140. *t.* 20. *f.* 3.

Sedum alpinum, foliis crenatis asperis. *Bauh. Pin.* 284. *Prod.* 132. *Gesn. Fasc.* xxii. *t.* 6. *f.* 27. (*bene.*)

Sedum alpinum hispidum ferè spinosum, flore pallido. *Bauh. Hist.* iii. *p.* 695. *Moris. Hist.* iii. *p.* 479. *s.* 12. *t.* 10. *f.* 25.

Sedum minimum alpinum villosum alterum. *Park. Theat.* 738.

Habitat in alpibus Helveticis et Pyrenaicis. ♃. (v. v. c.)

Planta cæsia, hispida, surculosa. *Surculi* elongati, decumbentes, gemmiferi, villosi, rigidi, rubescentes, densè foliosi. *Caules* erecti, rigidi, fragiles, 2—3-unciales, ramosi, rubescentes, pauciflori, pilis brevibus hispidulosi. *Folia* lineari-lanceolata, plana, utrinque nuda, striata, apice mucrone corneo instructa, margine spinulis ciliata. *Pedunculi* longiusculi, rigidi, subuniflori, calycesque pilis glanduliferis levitèr instructi. *Flores* magni, lactei. *Laciniæ calycinæ* latè ovatæ, mucronatæ, 5-nerves, extus rugosæ: marginibus membranaceis nudis. *Petala* obovata, triplinervia: nervis ramosis flexuosis. *Filamenta* lutea. *Antheræ* aureæ.

37. *S. hispidula*, caulibus filiformibus hispidis, foliis ovatis mucronatis setosis utrinque unidentatis, flore terminali subsessili, calycibus setosis.

Habitat

Habitat in Nepaliæ alpibus. *Wallich.* ♃. (v. s. in Herb. Lamb.)

Planta tenella. *Caules* plures, sesqui- vel bi-unciales, simplicissimi, graciles, filiformes, adscendentes, pilis setosis patentibus undique densè tecti. *Folia* alterna, sessilia, ovata, mucronata, hispida, margine dente parvo aristato utroque instructa. *Flos* luteus, terminalis, solitarius, brevissimè pedicellatus, in æstivatione nutans. *Calyx* setis glanduliferis hispidus: *laciniæ* triangulari-ovatæ, aristatæ. *Petala* parva, suborbiculata, triplinervia: nervis simplicibus rectis. *Stamina* pistillis longiora; *filamenta* gracilia, flava; *antheræ* intensè croceæ. *Styli* apice incurvi.

38. S. *bryoides*, rosulis globosis, foliis imbricatis subulatis mucronatis ciliatis, laciniis calycinis ovatis obtusis, petalis oblongis, caule oligophyllo unifloro.

S. bryoides. *Linn. Sp. Pl.* 572. *Jacq. Misc.* ii. *p.* 49. *t.* 5. *f.* 1. (*optima.*) *Scop. Carn. n.* 497. *t.* 15. *Willd. Sp. Pl.* ii. *p.* 643. *Lapeyr. Pyren. Saxif. p.* 35. *Lam. Encycl.* vi. *p.* 678. *Persoon Synop.* i. *p.* 488.

S. foliis lanceolatis ciliatis compactis, caule unifloro. *Hall. Helv.* 969.

S. pyrenaica minima lutea musco similis. *Tournef. Inst.* 253.

Sedum muscosum. *Bauh. Hist.* iii. *p.* 695. *Scheuch. Alp.* 142. *t.* 21. *f.* 2.

Sedum alpinum quartum. *Col. Ecphr.* ii. *p.* 66. *t.* 67. *f.* 1. 2.

Habitat in Austriæ, Helvetiæ, Pyrenaic. alpibus. ♃. (v. s. in Herb. Banks. et Lamb.)

Planta densè cæspitosa, rosulata. *Radix* sublignosa fibris pluribus instructa. *Rosulæ* foliorum confertæ, globosæ, cæsiæ.

cæsiæ. *Caules* plures, erecti, sesqui- v. bi-unciales, rigidi, uniflori, foliis aliquot minimis adpressis et pilis glanduliferis instructi. *Folia* densè imbricata, lineari-subulata, subtriangularia, carinata, glabra, suprà concaviuscula, margine ciliis cartilagineis armata: apicibus incurvis mucrone calloso terminatis. *Flos* ochroleucus magnitudine *S. asperæ*. *Calyx* levitèr glandulosus: *laciniæ* ovatæ, obtusæ, 5-nerves. *Petala* oblonga punctis aureis adspersa, trinervia: nervis parallelis simplicibus. *Filamenta* gracilia. *Antheræ* croceæ.

39. *S. cherlerioides*, rosulis globosis, foliis densè imbricatis spathulatis mucronatis ciliatis, laciniis calycinis semi-ovatis obtusis, petalis obovatis, caule filiformi multifloro.

S. bryoides? *Pallas. Ms.*

Habitat in rupibus Kamtschatkæ. *D. Merk.* ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Planta in cæspitibus planis et latis vegetans. *Rosulæ* foliorum confertæ, parvæ, globosæ. *Caules* adscendentes, bipollicares, filiformes, graciles, 4—5-flori, foliis paucis minimis ovatis adpressis ciliatis et glandulis sparsìm instructi. *Folia* creberrimè imbricata, obovato-spathulata, suprà concava, subtùs convexa, margine ciliata: apicibus inflexis mucronatis. *Flores* corymbosi, ochroleuci, præcedente multò minores. *Pedicelli* elongati, capillares, uniflori, calycesque glandulis minutis adspersis. *Laciniæ calycinæ* semi-ovatæ, obtusæ. *Petala* obovata, calyce duplò longiora, trinervia: nervis simplicibus rectiusculis.

Præcedenti quodammodo accedens, tamen characteres indicati speciem esse distinctissimam monstrant.

Sectio

Sectio 4.

40. *S. hieracifolia*, foliis petiolatis ellipticis acutis repando-dentatis glabris, pedicellis aggregatis unifloris in spicam dispositis, petalis lanceolatis acutis.

S. hieracifolia. *Waldst. et Kit. Hung.* i. *p.* 17. *t.* 18. (*optima.*) *Willd. Sp. Pl.* ii. *p.* 641. *Lam. Encycl.* vi. *p.* 674. *Geners. Catal. Scepus. n.* 229. *Wahlenb. Carpath.* 119. *Persoon Synop.* i. *p.* 487.

S. nivalis v. racemosa. *Towns. It. Hung. p.* 488. *t.* 15.

S. rotundifolia. *Geners. Elench. Scep. n.* 372.

Habitat in alpibus Carpathicis. ♃. (v. s. in Herb. Banks.)

Radix fibris longissimis crassiusculis simplicibus instructa. *Folia* petiolata, patentia, elliptica, acuta, repando-dentata, dentibus remotis mucronulatis, utrinque glabra, pilis articulatis ciliata. *Petioli* dilatati, nervosi, margine membranacei. *Scapus* erectus, palmaris pedalisve, simplicissimus, teres, pilis articulatis glanduliferis undique tectus. *Pedicelli* elongati, uniflori, in fasciculis 4—6-floris aggregati, et per spicam elongatam digesti: fasciculis inferioribus remotis; supremis approximatis. *Bracteæ* lanceolatæ, obtusæ, ad basin cujusdam fasciculi sitæ et pedicellorum longitudine. *Calyces* pedicellique pilis brevibus glandulosis tecti: laciniæ breves, triangulari-ovatæ, acutæ. *Petala* ovato-lanceolata, acuta, calyce breviora et angustiora, colore spadiceo-ferrugineo vel lurido. *Filamenta* brevissima. *Antheræ* flammeæ. *Styli* brevissimi, recurvati.

There is a single specimen of this plant in the Banksian Herbarium from Jacquin, and sent by him under the name of *S. nivalis*, a plant with which the Austrian botanists confounded it.

 This

This plant has never, I believe, been introduced into our gardens; the *Saxifraga pensylvanica β.* being often kept under the name.

41. *S. pensylvanica*, foliis impetiolatis lanceolatis sinuato-denticulatis utrinque pilosissimis, scapo ramoso, floribus corymboso-capitatis, petalis linearibus calyce longioribus.

S. pensylvanica. *Linn. Sp. Pl.* 571. (exclus. synon. *Pluken.*) *Mill. Dict. n.* 8. *Willd. Sp. Pl.* ii. *p.* 640. (exclus. synon. *Plukenetii.*) *Lam. Encycl.* vi. *p.* 674. *Persoon Synop.* i. *p.* 487. *Hort. Kew.* iii. *p.* 65. *Pursh Amer. Septent.* i. *p.* 311.

S. foliis radicalibus denticulatis, caule subnudo piloso ramoso, floribus confertis capitatis. *Gron. Virg.* 49.

S. noveboracensis. *Cold. Noveb.* 105.

S. pensylvanica, floribus muscosis racemosis. *Dill. Elth.* 337. *t.* 253. *f.* 328. (*bona.*)

β. minor, foliis lævioribus.

Habitat α in Noveboracensis et Virginiæ pratis humidis: *β* in hortis colitur. ♃. (v. v. c.)

Radix fibris longissimis crassis simplicibus instructa. *Folia* numerosa, impetiolata, latè lanceolata, acuta, sinuato-denticulata, utrinque pilis articulatis tecta, sæpiùs palmaria, basi angustata. *Scapus* erectus, sesqui- v. bi-pedalis, teres, paniculatìm ramosus, pilis articulatis patentibus viscidis undique densè tectus. *Rami* alterni divisi; inferiores remoti; superiores approximato-conferti. *Flores* pedicellati, in corymbis densis semiglobosis dispositi. *Pedicelli* elongati, uniflori, calycesque pilis glanduliferis densissimè obsiti. *Laciniæ calycis* ovatæ, acutiusculæ, obscurè trinerves. *Petala* linearia, obtusa, uninervia, squalido-alba, calyce duplò longiora.

42. *S. semi-*

42. *S. semipubescens*, foliis impetiolatis oblongo-ovalibus obtusis glaberrimis denticulatis, scapo ramoso, floribus corymboso-capitatis, petalis ovalibus calycem subæquantibus.

S. semipubescens. *Sweet. Hort. Suburb.* 97.

Micranthes semipubescens. *Haworth Synop. Succul. append.* 321.

S. marilandica. *Hortor.*

Habitat in Americâ boreali? ♃. (v. v. c.)

Radix fibris longissimis simplicibus crassis instructa. *Folia* impetiolata, patentia, oblongo-ovalia, obtusa, crassiuscula, avenia, suprà nitida, margine denticulata. *Scapus* erectus, pedalis et ultra, ramosus, pilis articulatis glanduliferis levitèr tectus. *Rami* alterni; inferiores remoti, divisi; superiores simplices, conferti. *Flores* pedicellati in corymbis densis semiglobosis dispositi. *Pedicelli* elongati, uniflori, calycesque pilis glanduliferis instructi. *Laciniæ calycinæ* triangulari-ovatæ, acutæ, sub microscopum trinerves. *Petala* ovalia, obscurè trinervia, flavida, calycem subæquantia.

This plant has been cultivated for many years in our gardens under the name of *S. marilandica*; hence it is supposed to be native of North America, which is very probable, from its affinity with *S. pensylvanica*. I cannot however find it mentioned in any of the books which treat of the plants of that country; and it does not appear to have been even taken up by any one, until Mr. Haworth, the author of *Miscellanea Naturalia* and *Synopsis of Succulent Plants*, noticed it in his appendix to the latter work. No doubt can be entertained of its being sufficiently distinct from *S. pensylvanica*, to which it is nearest allied. It is distinguished from it by its oblong-oval, obtuse, and quite smooth leaves, the margins of which are simply denticulated, not

not sinuated as in *S. pensylvanica* ; by the stem being much less hairy; and lastly, by its oval petals, about equal the length of the calyx.

43. *S. virginiensis*, foliis ovatis acutis dentatis petiolatis, petalis ovalibus: nervis ramosis, scapo paniculatìm ramoso.

S. virginiensis. *Mich. Amer. Bor.* i. *p.* 269. *Lam. Encycl.* vi. *p.* 675. *Pursh Amer. Sept.* i. *p.* 310.

S. pilosa. *Herb. Banks.*

S. vernalis. *Willd. Hort. Berol. p.* 43. *t.* 43. *ejusd. Enum. p.* 459. *Sternb. Saxif. p.* 8.

S. elongata. *ejusd. p.* 9. *t.* 4.

S. foliis cordatis ovalibus crenatis, corollâ albâ, caule hirsuto aphyllo. *Gron. Virg.* 160.

Sanicula virginiana alba, folio oblongo mucronato. *Pluk. Alm.* 331. *t.* 39. *f.* 1. *et t.* 222. *f.* 5.

Habitat in Virginiæ, Carolinæ et Novæ-Angliæ montibus, inque Canada. ♃. (v. v. c. et s. sp.)

Planta pulchella, subcæspitosa. *Folia* patentia, petiolata, ovata, acuta, dentata, utrinque pilis adspersa. *Scapus* erectus, palmaris, paniculatìm ramosus, pilis mollibus glanduliferis undique tectus, rariùs foliis 1—2 munitus. *Rami* alterni, recti; inferiores elongati; omnes subæquales. *Flores* parvi, albi. *Pedicelli* numerosi, graciles, uniflori, pube viscidâ suppediti. *Laciniæ calycinæ* breves, ovatæ, obsoletè 5-nerves: nervis ramosis. *Petala* ovalia calyce longiora, trinervia: nervis flexuosis, ramosis.

This plant appears to hold the same place among American vegetation as the *S. nivalis* amidst European. This latter plant is not, I am of opinion, to be found in America. I am therefore inclined to think Pursh's *nivalis* belongs to the present species;

cies; and what convinces me of their being the same is, that there are several specimens in his Canadian Herbarium (now in Mr. Lambert's possession) of *S. virginiensis* under the name of *S. nivalis.*

44. S. *nivalis,* foliis subrotundo-obovatis undulato-crenatis subsessilibus, scapo simplici, floribus congesto-capitatis, petalis subrotundis unguiculatis: nervis simplicibus.

S. nivalis. *Linn. Sp. Pl.* 573. (exclus. synon. *Gron. Virg.*) *Huds. Angl.* 180. *Lightf. Scot.* i. *p.* 221. *cum fig.* (*mala.*) *Willd. Sp. Pl.* ii. *p.* 645. *With. Brit.* 403. *Lam. Encycl.* vi. *p.* 683. *Smith Brit.* ii. *p.* 449. *Engl. Bot. t.* 440. (*bona.*) *Persoon Synop.* i. *p.* 488. *Sternb. Saxif. p.* 12. *Wahlenb. Lapp.* 113.

S. foliis subovatis crenatis, caule nudo, floribus capitatis. *Linn. Suec.* 354. 368.

S. caule nudo simplici, foliis elliptico-subrotundis crenatis, floribus capitatis. *Linn. Suec.* 176. *t.* 2. *f.* 5. 6. (*mala.*)

S. foliis oblongo-rotundis dentatis, floribus compactis. *Raii Angl.* iii. *p.* 354. *t.* 16. *f.* 1.

Sempervivum minus dentatum. *Mart. Spitzb.* 43. *t.* F. *f.* A.

Sedum III. *Oed. Dan. t.* 28. (*pessima.*)

Habitat in summis alpibus Lapponiæ, Scotiæ, Spitzbergens. et Angliæ borealis. ♃. (v. v. sp.)

Planta subcæspitosa. *Folia* subrotundo-obovata, undulato-crenata, subsessilia, suprà glabra, subtùs villosa, humi patentia. *Scapus* erectus, 3-uncialis, simplex, villis viscidis confertè tectus. *Flores* congestè capitati, bracteati. *Bracteæ* lanceolatæ, acutæ, ciliatæ. *Pedicelli* breves calycesque pube viscidâ obsiti. *Laciniæ calycis* triangulares obscurè trinerves. *Petala* subrotunda, unguiculata, triplinervia:

plinervia: nervis simplicibus, primùm candida demùm rubescentia, calycem excedentia. *Filamenta* brevissima, alba posteà rubescentia.

45. S. *longiscapa*, foliis ovatis serratis longè petiolatis, thyrso ovato, laciniis calycinis ovatis acutis.

Habitat in Sibiriâ. *Pallas* ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Radix fibrosa. *Folia* ovata, subacuta, serrata, longè petiolata, plana, utrinque hirsuta. *Scapus* erectus, palmaris, filiformis, teres, simplicissimus, pilis patentibus glanduliferis densè tectus. *Flores* thyrsoidei: *thyrso* ovato, denso. *Pedicelli* brevissimi, calycesque pube brevi vestiti. *Laciniæ calycinæ* ovatæ, acutæ, obscurè trinerves. *Petala* parva, ovata, alba, vix calyce longiora. *Filamenta* brevissima, alba. *Antheræ* luteæ.

Præcedenti arctè affinis, sed satis diversa videtur: foliis ovatis planis serratis longè petiolatis, scapo duplò longiore, floribus thyrsoideis, petalis ovatis.

46. S. *davurica*, foliis cuneiformibus longè petiolatis basi attenuatis apice grossè inciso-dentatis, floribus laxè-paniculatis, petalis ellipticis acutis.

S. davurica. *Willd. Sp. Pl.* ii. *p.* 645. *Lam. Encycl.* vi. *p.* 684. *Persoon Synop.* i. *p.* 488. *Sternb. Saxif. p.* 13.

S. punctata. *Pall. It.* iii. *app. n.* 91. *t.* P. *f.* 2. (*bona*.)

Habitat in summis alpibus Davuriæ prope limitem nivis perpetuæ. *Pallas*. ♃. (v. s. in Herb. Pallas. nunc Lamb.)

Planta densè cæspitosa. *Radix* fibrosa. *Folia* cuneiformia, longè petiolata, utrinque pubescentia, basi attenuata, integerrima, apice grossè acutèque inciso-dentata. *Petioli* lineares,

lineares, plani, basi latè dilatati. *Scapi* erecti, digitales rariùs palmares, ramosi, pilis glanduliferis parcè obsiti. *Flores* laxè paniculati. *Pedicelli* dichotomi calycesque pube glutinosâ tecti. *Laciniæ calycinæ* triangulari-ovatæ, acutæ. *Petala* elliptica, acuta, trinervia, alba, basi punctis binis flavis minutis munita.

There are many fine specimens of this very distinct and little known plant in the Herbarium of the celebrated Pallas, in the possession of A. B. Lambert, Esq. Some botanists have supposed this plant to be nearly allied to *S. cuneifolia*; and a slight variety of this is cultivated in the gardens under the name.

47. *S. pyrolifolia*, foliis ovalibus coriaceis petiolatis glabris nitidis crenatis, floribus paniculatis, petalis linearibus.

Habitat in Kamtschatkâ (*Merk*), in insulâ oræ occidentalis Americæ borealis Unalaska dictâ (*David Nelson*). ♃. (v. s. in Herb. Banks. et Pallas. nunc Lamb.)

Species distinctissima. *Pyrolam* refert. *Radix* lignosa, patens, fusca, fibris instructa, supernè rudimentis foliorum emarcidorum tecta. *Folia* ovalia, coriacea, petiolata, utrinque glabra, suprà nitida, reticulata, margine crenata. *Petioli* breves, dilatati, margine membranacei, ciliati. *Scapus* adscendens, 5-pollicaris, pilis glanduliferis levitèr adspersus. *Flores* coarctato-paniculati, parvi, albi. *Pedicelli* multiflori calycesque pube brevi glutinosâ obsiti. *Laciniæ calycinæ* brevissimæ, obtusæ. *Petala* linearia, calyce longiora. *Filamenta* pallida. *Antheræ* flavæ. *Styli* recti.

Sectio 5.

§. *Foliis indivisis, plerumque rosulatis impetiolatis.*

48. *S. Cotyledon*, foliis planis spathulatis cartilagineo-serratis, calycibus densè glandulosis: laciniis lineari-lanceolatis, petalis oblongo-spathulatis.

S. Cotyledon. *Linn. Sp. Pl.* 570. *Fl. Dan. t.* 241. (*optima.*) *Olaus It. Island. p.* 433. *Wahlenb. Lapp. p.* 111. (exclus. synon. *Willd.*)

S. pyramidalis *Lapeyr. Pyren. Saxif. p.* 32. *Sternb. Saxif. p.* 2. *t.* 2. *Persoon Synops.* i. *p.* 489.

S. pyramidata. *Mill. Dict. n.* 4.

S. foliis lingulatis radicalibus margine cartilagineo acutè serratis, floribus paniculatis. *Linn. Suec.* 356. 366.

S. foliis radicalibus in orbem positis: serraturis cartilagineis. *Linn. Lapp.* 177. *t.* 2. *f.* 2.

S. foliorum orâ cartilagineâ, caule triplicato ramoso, petalis immaculatis. *Hall. Helv. n.* 977.

S. sedi folio flore albo multiflora. *Tournef. Inst.* 252.

Sedum serratum, flore albo, multiflorum. *Dod. Pempt.* 113. *Robert. Icon.* 91.

Habitat in alpibus Lapponiæ, Norvegiæ, Islandiæ, Helvetiæ, Pyrenæorum. ♃. (v. v. c.)

Planta densè cæspitosa. *Caules* erecti, pedales, pyramidato-ramosissimi, multiflori, foliosi, pilis glanduliferis confertissimè tecti. *Folia* radicalia in rosulis latè expansis, plana, spathulata, utrinque glabra, suprà lucida, apice rotundata, mucronata, margine acutè argenteo-serrata; caulina brevia, cuneiformia, patentia. *Pedunculi* multiflori, racemosi, cernui. *Flores* magni, campanulati, candidi. *Calyces pedicelli*que pilis glanduliferis densè

densè obtecti: laciniæ lineari-lanceolatæ, obtusæ. *Petala* oblongo-spathulata, impunctata, conspicuè triplinervia: nervis simplicibus.

49. *S. lingulata*, foliis lineari-lingulatis canaliculatis tuberculato-crenatis, calycibus densè glandulosis: laciniis semiovatis obtusis, petalis ovalibus.

S. lingulata. *Bellardi in Act. Taur.* v. *p.* 226. *ejusd. App. ad Fl. Pedem. p.* 20.

S. Cotyledon. *Mill. Dict. n.* 2. *Willd. Sp. Pl.* ii. *p.* 638. *Lam. Encycl.* vi. *p.* 670. *Scop. Carn. ed.* ii. *n.* 489?

S. longifolia. *Lapeyr. Pyren. Saxif. p.* 26. *t.* 11. *Persoon Synop.* i. *p.* 487. *Lam. et Decand. Fl. Franc.* iv. *p.* 359. *ejusd. Synop. p.* 317.

S. montana pyramidata, folio longiore. *Tournef. Inst.* 253.

β. media, foliis brevioribus, caule supernè paniculato.

S. longifolia *β.* media. *Sternb. Saxif. p.* i. *t.* 1. *α.* (*bona.*)

Cotyledon minor. *Hort. Eystet. Ord.* v. *pl.* 10. *f.* 1.

Sedum serratum alterum, foliis longis angustis. *Raii Hist.* ii. *p.* 1045. *n.* 1.

Sanicula montana crenata, folio longiore, pediculo folioso. *Pluken. Phyt. t.* 222. *f.* 1.

γ. crustata, quadruplò minor; foliis angustissimis margine insignitèr crustaceo-porosis, paniculâ pauciflorâ.

S. longifolia *γ.* minor. *Sternb. l. c. t.* 1. *b.*

S. crustata. *Vest. Man. Bot. p.* 656. *Hoppe Bot. Tasch.* 1805. *p.* 237. *t.* 1. *Bot. Bibl.* 1805. *p.* 42. *et* 369. *Dicks. Hort. Sicc. fasc.* 1.

δ. subnana, flabelliformis; cauliculis simplicibus. *Lapeyr. loc. cit.*

Habitat α in summis alpibus Pyrenæorum et Helvetiæ, in alpibus maritimis aliisque locis alpinis Montregalensi-

 bus;

bus; β in Carniolæ et Carinthiæ alpibus, etiam in montibus Pontebanis; γ in alpibus Helveticis, Carniolicis, Carinthiacis et Pyrenæorum; δ in summis Pyrenæorum. ♃. (α et γ v. s; β v. v. c.)

Planta densè cæspitosa. *Caules* erecti, sesquipedales, flexuosi, à basi pyramidato-ramosissimi, foliosi, pilis glanduliferis confertissimè tecti. *Folia* radicalia in rosulis latè expansis, lineari-lingulata, longissima, rigida, glauca, utrinque glabra, suprà canaliculata, subtùs obtusè carinata, basi ciliata, apice recurvata, margine crustaceo-porosa et tuberculato-crenata; caulina linearia, obtusa, recta, tuberculato-crenata, apice recurvata. *Pedunculi* longi, patentes, multiflori, calycesque pube brevi glandulosâ ferrugineâ densè obsiti. *Flores* plani. *Laciniæ calycinæ* breves, semi-ovatæ, obtusissimæ. *Petala* ovalia, alba, conspicuè triplinervia (nervis simplicibus), punctis numerosis roseis instructa.

50. *S. Aizoon*, foliis brevibus cuneatis argenteo-serratis, floribus corymbosis, calycibus glabris: laciniis acutis, petalis suborbiculatis.

S. Aizoon. *Murr. Syst. ed.* 14. *p.* 411. *Jacq. Austr.* v. *t.* 438. (*bona.*) *Willd. Sp. Pl.* ii. *p.* 639. (exclus. synon. *Fl. Lapp. et Seguier. Ver.*) *Lapeyr. Pyren. Saxif. p.* 33. *Lam. Encycl.* vi. *p.* 672. (exclus. *Fl. Lapp. et Seguier. Ver.*) *Persoon Synop.* i. *p.* 487. *Hort. Kew. ed.* 2. 3. *p.* 65. *Sternb. Saxif. p.* 3. *t.* 3. *f.* α. (*media.*) (exclus. synon. *Willd. Hort. Berol. Lapeyr. Pyren. p.* 33. *t.* 15. *nec non Linn. Suec. et Lapp. et Seguier. Veron.*) *Wahlenb. Carpath. p.* 116.

S. paniculata. *Mill. Dict. n.* 3.

S. foliorum orâ cartilagineâ, serratâ, petiolis paucifloris, petalis

petalis punctatis. *Var. β.* foliis brevioribus et latioribus. *Hall. Helv.* 978.

S. foliis subrotundis serratis. *Tournef. Inst.* 252.

Cotyledon minor, foliis subrotundis serratis. *Bauh. Pin.* 285. *Prod.* 133. *Raii Hist. p.* 1046. *n.* 5.

Sedum montanum roseum, serratum, foliis rubrotundis. *Barrel. Icon. t.* 1310.

Sedum serratum album bicorne, breviore folio, marginibus argenteis. *Moris. Hist. s.* 12. *t.* 9. *f.* 19.

Cotyledon minus, sedi folio, montanum. *Lob. Adv. p.* 165.

β. retusa; duplò minor; foliis brevioribus retusis.

S. Aizoon *β.* minor brevifolia. *Sternb. loc. cit. t.* 3. *f. β.*

Habitat in Austriæ, Helvetiæ, Carpathiæ et Pyrenæorum alpibus. ♃. (v. v. c. *α* et *β.*)

Planta in cæspitibus latis et planis densè vegetans. *Caules* erecti, firmi, simplices, 4—5-unciales, foliosi, nitidi, pilis glanduliferis levitèr adspersi. *Folia* radicalia in rosulis conferta et conniventia, cuneiformia, plana, glauca, margine argenteo-serrata, basi ciliata; caulina obovata, mucronulata, ciliato-serrata, subadpressa. *Flores* corymbosi, sequenti majores, pulcherrimi. *Pedunculi* elongati, subbiflori, glabriusculi. *Calyx* glaberrimus: laciniæ brevè-triangulari-ovatæ, acutæ. *Petala* suborbiculata, oculis armatis trinervia (nervis ramosiusculis), lactea, punctis roseis minutis instructa. *Filamenta* brevia, compressa. *Styli* brevissimi.

51. *S. intacta,* foliis linearibus acutis strictis argutè argenteo-serratis, calycibus parcè glandulosis: laciniis obtusis, petalis ovalibus.

S. intacta. *Willd. Hort. Berol.* ii. *p.* 75. *t.* 75. (*bona.*) *ejusd. Enum. p.* 459.

S. recta.

S. recta. *Lapeyr. Pyren. Saxif. p.* 33. *t.* 15. (*optima.*)
S. Cotyledon. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 313. (exclus. synon.)
S. Aizoon. *Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 74. (exclus. synon.)
S. cartilaginea. *Sternb. Saxif. p.* 5. *t.* 3. c.
S. foliorum orâ cartilagineâ, serratâ, petiolis paucifloris, petalis punctatis. *Var.* α. *Hall. Helv.* 978.
S. sedi folio angustiore, serrato. *Tournef. Inst.* 252. *Seguier. Ver.* 448. *t.* 9. *f.* 1.
Sedum serratum album bicorne, longiore folio, marginibus argenteis. *Moris. Hist. s.* 12. *t.* 9. *f.* 20.
Sedum serratum. *J. Bauh. Hist.* iii. 689.
Aizoum serratum. *Val. Cord. Hist. pl.* 92.
Habitat in alpibus Tyrolensibus, Pyrenaicis et Caucasicis. ♃. (v. v. c.)

Planta in cæspitibus conicis densis vegetans. *Caules* erecti, palmares v. pedales, præcedenti rigidiores, foliosi, pilis glanduliferis confertè tecti. *Folia* radicalia in rosulis aggregata, stricta, linearia, acuta, plana, glauca, utrinque glabra, argutè argenteo-serrata, basi ciliata; caulina spathulata, subadpressa, ciliato-serrulata. *Flores* racemosi. *Pedicelli* subbiflori, incurvi, præcedente breviores, pilis glanduliferis crebrè tecti. *Calyx* pilis raris adspersus: laciniæ ovatæ, obtusæ. *Petala* ovalia, obscurè trinervia (nervis simplicibus rectiusculis), lactea, punctis minutis roseis raris instructa. *Filamenta* compressa. *Styli* brevissimi.

Linnæus confounded the three preceding species under *S. Cotyledon*, a name which I have preferred retaining to the plant described by him in *Flora Lapponica* and *Flora Suecica*, and of which

which there is a good figure in *Flora Danica*. They afford abundant characters to keep them distinct, and these marks always remain constant in cultivation, and when re-produced from seed. The *S. Cotyledon* is remotely distinct from all of them.

52. S. *mutata*, foliis planis spathulatis cartilagineo-crenatis ciliatisque, calycibus densè glandulosis: laciniis latè-ovatis acutis, petalis lineari-lanceolatis acuminatis.

S. mutata. *Linn. Sp. Pl.* 570. *Jacq. Icon. Rar.* 3. *t.* 466. (*optima.*) *ejusd. Collect.* i. *p.* 284. *Curt. Mag.* 351. *Willd. Sp. Pl.* ii. *p.* 640. *Lapeyr. Pyren. Saxif. p.* 31. *Lam. Encycl.* vi. *p.* 672. *Persoon Synop.* i. *p.* 487. *Hort. Kew. ed.* 2. 3. *p.* 65. *Sternb. Saxif. p.* 6.

S. foliorum orâ cartilagineâ rarissimè dentatâ, petalis maculosis. *Hall. Helv.* 979. *t.* 16.

S. foliorum limbo cartilagineo integro, spicâ longâ, floribus purpureo-croceis. *Hall. Helv. edit. prior. Segu. Ver.* iii. *p.* 199. *Burs.* XVI. 98.

Geum alpinum majus viscosum, foliis oblongo-rotundis, atro-rubentibus et croceis floribus. *Scheuch. It.* ii. *p.* 124.

Habitat in alpibus Helvetiæ, Carniolæ, Italiæ et Pyrenæorum. ♃. (v. s. in Herb. Banks. et Lamb.)

Species distinctissima. *Planta* densè cæspitosa. *Caules* erecti, palmares v. pedales, foliosi, pilis patentibus glanduliferis confertissimè tecti. *Folia* radicalia in rosulis latè expansis, spathulata, plana, utrinque glabra, margine cartilagineo-crenata, villis longis numerosis patentibus fimbriata; caulina obovata, basi ciliata, apice cartilagineo-crenata. *Flores* paniculati. *Pedunculi* calycesque pube molli ferrugineâ glutinosâ densè tecti. *Laciniæ calycinæ* latè-triangulari-ovatæ, acutæ, obsoletè nervosæ.

Petala

Petala lineari-lanceolata, acuminata, trinervia, crocea, maculis saturatioribus instructa. *Filamenta* crocea. *Antheræ* fulvæ.

53. *S. media*, foliis radicalibus aggregatis lingulatis integerrimis; margine cartilagineo suprà punctato, petalis obtusis calyce brevioribus. *Smith Prod. Fl. Græc.* i. *p.* 276.

S. media. *Gouan Illust.* 27. *Poiret in Lam. Encycl.* vi. *p.* 675. *t.* 372. *f.* 6. *Fl. Græc. Icon. Ined.* 376. *Sternb. Saxif. p.* 6.

S. calyciflora. *Lapeyr. Pyren. Saxif. p.* 28. *t.* 12. (*optima.*) *Persoon Synops.* i. *p.* 487.

S. cæsia. *Linn. Mantiss.* 382. *nec Sp. Pl. ex Smithio loc. cit.*

S. alpina parva, sedi folio, non serrata. *Mich. Plant. Rom. et Neap. n.* 704.

Habitat in Pyrenæorum rupibus calcareis (*Gouan, La Peyrouse*), in Olympi Bithyni cacumine (*Sibthorp*). ♃. (v. s. in Herb. Banks.)

Planta in cæspitibus conicis vegetans. *Caules* erecti, digitales, simplices, rigidi, villis tortuosis ferrugineis viscidis densè tecti. *Folia* radicalia in rosulis aggregata, imbricata, lingulata, mucronata, rigida, glauca, utrinque glabra, suprà plana, punctata, subtùs convexa, subcarinata, margine integerrima, cartilaginea, nuda, basi ciliata; caulina cuneata glanduloso-pilosa. *Flores* racemosi, bracteati. *Pedicelli* breves, uniflori, calycesque villis viscidis densè obsiti. *Calyces* campanulati: laciniæ brevè-triangulari-ovatæ, acutæ, rectæ, conniventes. *Petala* parva, obovata, atro-purpurea, cum genitalibus intra calycem inclusa.

54. *S. La-*

54. *S. Lapeyrousii*, foliis radicalibus aggregatis lingulatis integerrimis: margine cartilagineo, floribus paniculatis, petalis obovatis integerrimis conniventibus calyce longioribus.

S. luteo-purpurea. *Lapeyr. Pyren. Saxif. p.* 29. *t.* 14. *Lam. Encycl.* vi. *p.* 675. *Persoon Synop.* i. 487. *Sternb. Saxif. p.* 7.

Habitat in Pyrenæorum rupibus calcareis. *La Peyrouse.* ♃.

Pedunculi calycesque pube purpureâ viscidâ densissimè vestiti.

Obs. Species prorsùs mihi incognita nisi ex figurâ et descriptione Clariss. Lapeyrouse, a quibus characterem suprà scriptum desumpsi, verè præcedenti admodùm affinis est; sed floribus paniculatis et petalis citrinis calyce longioribus videtur differe. Forsàn hybrida inter *S. mediam* et sequentem.

55. *S. aretioides*, foliis aggregatis lineari-lingulatis strictis mucronulatis carinatis glaucis cartilagineo-marginatis, caule glutinoso-tomentoso, petalis lineari-spathulatis apice crenulatis.

S. aretioides. *Lapeyr. Pyren. Saxif. p.* 28. *t.* 13. *Lam. Encycl.* vi. *p.* 676. *Persoon Synon.* i. *p.* 487. *Sternb. Saxif. p.* 7.

S. pyrenaica lutea minima, sedi foliis densissimè congestis. *Tournef. Inst.* 253.

Habitat in rupibus calcareis Pyrenæorum (*La Peyrouse*), in Helvetiæ alpibus Barèges dictis (*Prof. Stromeyer*). ♃. (v. s. in Herbar. Ventenat, nunc in Museo Lessertiano.)

Planta densè cæspitosa. *Radices* lignosæ. *Rosulæ* semiunciales, confertæ, ad bases foliis emarcidis undique densè

densè imbricatæ. *Caules* erecti, sesquiunciales, teretes, foliisque caulinis lingulato-linearibus obtusis tomento glutinoso tecti. *Folia* aggregatìm imbricata, lineari-lingulata, stricta, obsoletè mucronulata, glauco-viridia, subtùs obtusè carinata, suprà punctis remotis paucis juxta margines perforata, basi ciliato-denticulata: oris cartilagineis. *Flores* terni, aurei. *Pedicelli* calycesque pube glutinosâ densè instructi; lateralibus medium superantibus. *Calycis* laciniæ brevè ovatæ, acutæ, carnosæ. *Petala* lineari-spathulata, triplinervia, apice emarginata et crenulata: nervis strictis; lateralibus bifurcis. *Stamina* inæqualia pistillis breviora; *filamenta* pallidè lutea; *antheræ* aureæ.

Obs. Duabus præcedentibus affinis, at notis indicatis et plantâ multò minore distinctissima est.

56. *S. burseriana*, foliis aggregatis subulatis pungentibus lævibus glaucis, caule subunifloro, laciniis calycinis ovatis, petalis subrotundis oræ crispatis: nervis ramosis.

S. burseriana. *Linn. Sp. Pl. p.* 572. *Wulfen in Jacq. Misc.* i. *p.* 152. *t.* 17. *f.* 3. (*optima.*) *Willd. Sp. Pl.* ii. *p.* 642. *Lam. Encycl.* vi. *p.* 677. *Persoon Synops.* i. *p.* 488. *Sternb. Saxif. p.* 33. *t.* 10. *f.* 1.

S. foliis glaucis acutis monanthis, caule folioso. *Segu. Ver.* iii. *p.* 201. *t.* 5. *f.* 2.

Sedum alpinum, saxifragæ albæ flore. *Bauh. Pin.* 284. *Burs.* XVI. 6.

Sedum montanum minimum, caryophylli folio, lacteo flore. *Raii Hist.* ii. *p.* 1041. *n.* 8.

Sedum alpinum quartum. *Col. Ecphr.* ii. *p.* 66. *f.* 4.

β. caule subbifloro. *Sternb. loc. cit. t.* 10. β.

γ. *Vandelli*, foliis ciliatis, caule subquadrifloro.

S. bur-

S. burseriana, β. *Jacq. Misc.* i. *p.* 153. *Lam. Encycl.* vi. *p* 677. *Persoon Synop.* i. *p.* 488.

S. Vandelli. *Sternb. Saxif. p.* 34. *t.* 10. *f.* 3.

S. burseriana. *Lapeyr. Pyren. Saxif. p.* 35.

S. foliis compactis plicatis pungentibus, caule viscido paucifloro. *Hall. Helv.* 983. *Act. Helv.* vi. *p.* 10.

S. foliis aggregatis subulatis lævibus, caule subnudo multifloro. *Vandelli It. Ined. f.* 2. (ex *Sternb. l. c.*)

Sedum minimum Syriacum, luteolo flore saxifragæ albæ. *J. Bauh. Hist.* iii. *p.* 696. *Lobel. Obs. p.* 204. *Icon. Pl.* 376. *Dod. Pempt. p.* 132. *n.* 3. *Moris. Hist.* iii. *p.* 476. *s.* 12. *t.* 8. *f.* 1.

Habitat α in Taurero Radstattiensi (*Hoppe*), in alpibus Carinthiæ et Carniolæ (*Wulfen, Hohenwart, Vest*), in montibus Lessinensibus (*Seguier*), Tridentinis (*Ray*). In monte Grappa prope Bassanum in Italiâ superiori ipse legi. *Sternb. loc. cit.*

β. in alpe vicina Stoi Clagenfurtii. *Vest.*

γ. in monte Couza non procul a Lario Lacu (*Vandelli*), in Helvetiæ alpibus (*Schleicher, Sternb. loc. cit.*) ♃. (v. s. α in Herb. Banks.)

Planta densè cæspitosa. *Radix* lignosa, fibris numerosis instructa. *Surculi* erecti, brevissimi, basi rudimentis foliorum emarcidorum tecti, apice rosulati. *Caules* plures, erecti, bipollicares, oligophylli, uniflori, pilis glanduliferis brevibus tecti. *Folia* aggregata, subulata, triquetra, mucronata, glabra, rigida, glauca; caulina pauca, multò minora, adpressa. *Flos* magnus, pulcherrimus. *Calyx* pube glandulosâ obsitus; *laciniæ* latè ovatæ, acutæ, conspicuè nervosæ. *Petala* latè subrotunda, lactea, triplinervia, nervis ramosissimis flexuosis flavescentibus lineata: orâ crispatâ.

 57. *S. re-*

57. *S. retusa*, caule subtrifloro, foliis imbricatis oblongo-trigonis acutis suprà perforato-punctatis, petalis lanceolatis acutis, stylis corollam longè superantibus.

S. retusa. *Gouan Illustr.* 28. *t* 18. *f.* 1. *Lapeyr. Pyren. Saxif. p.* 38. *t.* 18. (*optima.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 365. *Persoon Synop.* i. *p.* 488. *Sternb. Saxif. p.* 37. *Wahlenb. Carpath.* 118.

S. imbricata. *Lam. Franc.* iii. *p.* 531? S. purpurea. *All. Ped.* 1531. *t.* 21. *f.* 2. (*bona.*)

S. oppositifolia, *γ. Willd. Sp. Pl.* ii. *p.* 648. *Lam. Encycl.* vi. *p.* 685.

S. alpina ericoides, flore purpurascente. *Tournef. Inst.* 258.

Sedum alpinum ericoides cæruleum. *Bauh. Prod.* 132. *Hist.* iii. *p.* 694.

Habitat in summis alpibus Pedemontanis, Pyrenaicis et Delphinatis. ♃. (v. s.)

Planta cæspitem valdè compactum et durum formans. *Surculi* procumbentes, rigidi, ramosi, densissimè foliosi. *Caules* numerosi, erecti, sesqui- v. bi-unciales, rigidi, oligophylli. *Folia* arctè quadrifariam imbricata, parva, oblonga, trigona, durissima, glabra, nitida, basi ciliata, supra aciem punctis ternis minutis perforata, apice recurvata, acuta. *Flores* terminales, subterni, purpurei. *Pedicelli* calycesque pube brevi glandulosâ instructi. *Calycis* laciniæ oblongo-ovatæ, obtusæ, margine nudæ. *Petala* lanceolata, acuta, triplinervia: nervis parallelis simplicibus. *Filamenta* capillaria, pallidè lilacina, corollâ longiora. *Antheræ* violaceæ. *Styli* stricti, longissimi.

58. *S. oppositifolia*, caule unifloro, foliis imbricatis ovatis planis obtusis ciliatis, laciniis calycis latè ovatis obtusis, petalis obovatis 5-nervibus, genitalibus corollâ brevioribus.

S. op-

S. oppositifolia. *Linn. Sp. Pl.* 575. *Fl. Sueo.* 359. 369. *Fl. Lapp.* 179. *t.* 2. *f.* 1. *Fl. Dan. t.* 34. *Gunn. Norv.* 53. *Huds. Angl.* 180. *Allion. Pedem.* 1529. *t.* 21. *f.* 3. (*bona.*) *Vahl. in Act. Hist. Nat. Hafn.* 2. 1. *p.* 51. *With. Brit.* 404. *Willd. Sp. Pl.* ii. *p.* 648. *Lapeyr. Pyren. Saxif. p.* 36. *t.* 16. (*optima.*) *Lam. Encycl.* vi. *p.* 686. *Smith Brit.* ii. *p.* 451. *Engl. Bot. t.* 9. (*bona.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 364. *Sternb. Saxif. p.* 36. *Hohenwart et Reiner It.* i. *p.* 133. *t.* 3. (*ex Sternb.*) *Wahlenb. Carpath.* 118. *Pursh Amer. Septent.* i. *p.* 311.

S. cærulea. *Persoon Synops.* i. *p.* 488.

S. caule repente, foliis quadrifariam imbricatis cartilagineis ciliatis. *Hall. Helv.* 980.

Sedum alpinum ericoides purpurascens. *Bauh. Pin.* 284. *Prod.* 152. *Moris. Hist.* i. *p.* 480. *s.* 12. *t.* 10. *f.* 36.

Habitat in rupibus alpinis Lapponiæ, Scotiæ, Helvetiæ, Spitzbergensis, Pyrenæorum, Angliæ et Americæ borealis. ♃. (v. v. sp.)

Planta cæspitem planum et latum formans. *Surculi* breves, procumbentes, gemmiferi, rubescentes, villis viscidis levitèr adspersi. *Caules* numerosi, unciales, erecti, uniflori, rubri, foliorum 2—3 jugis muniti. *Folia* ovata, plana, obtusa, glabra, ciliata, obscurè viridia; adultiora quadrifariàm imbricata, apice cartilaginea, 1—2 poris minutis sæpiùs perforata; juniora in surculis opposita, subdistantia; caulina opposita, remota, obovata. *Flos* magnus, pulcherrimus, lilacinus, terminalis, solitarius, sessilis. *Calyx* glandulosus: laciniæ latè ovatæ, obtusæ, carnosæ, rectæ, obscurè trinerves, margine ciliatæ. *Petala* obovata, lilacina, 5-nervia: nervis flexuosis ramosiusculis. *Genitalia* corollâ breviora; *filamenta* gracilia, rosea; *antheræ* violaceæ. *Styli* breves, crassi.

59. S. bi-

59. *S. biflora*, caule subtrifloro, foliis planis spathulatis laxis, petalis lineari-oblongis, genitalibus corollâ longioribus.

S. biflora. *Allion. Pedem.* 1530. *t.* 21. *f.* 1. (*bona.*) *Lapeyr. Pyren. Saxif. p.* 37. *t.* 17. (*optima.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 365. *Persoon Synops.* i. *p.* 488. *Sternb. Saxif. p.* 37. *Hohenwart et Reiner. It.* i. *p.* 138. *t.* 2. *f.* 2. (*ex Sternb.*)

S. oppositifolia, β. *Willd. Sp. Pl.* ii. *p.* 648. *Lam. Encycl.* vi. *p.* 685.

S. foliis imbricatis ovatis, caulibus reptantibus bifloris. *Hall. Helv.* 981.

Habitat in Pyrenæorum et Helvetiæ alpibus. ♃. (v. s.)

Obs. Summoperè quidem affinis est *S. oppositifoliæ*, sed plantâ majore et laxiore, et notis constantibus in definitionibus expressis satìs distincta.

60. *S. cæsia*, foliis lineari-oblongis aggregatis cretaceo-glaucis insignitèr recurvatis carinatis, petalis rotundatis unguiculatis, caule oligophyllo multifloro.

S. cæsia. *Linn. Sp. Pl.* 571. *Jacq. Aust. t.* 374. *Scop. Carn. ed.* ii. 495. *t.* 15. *Willd. Sp. Pl.* ii. *p.* 641. *Lam. Encycl.* vi. *p.* 676. *Lam. et Decand. Fl. Franc.* iv. *p.* 363. *Persoon Synops.* i. *p.* 487. *Sternb. Saxif. p.* 34.

S. recurvifolia. *Lapeyr. Pyren. Saxif. p.* 30.

S. foliis crassis duris recurvis subtùs sulcatis, basi ciliatis. *Hall. Helv.* 982.

S. alpina minima, foliis cæsiis deorsùm recurvis. *Segu. Veron.* 449. *t.* 9. *f.* 2. (*bona.*)

Sedum alpinum album, foliolis compactis. *Bauh. Pin.* 284. *Moris. Hist.* iii. *s.* 12. *t.* 7. *f.* 32.

Sedum alpinum minimum, foliis cinereis, flore candido. *Scheuch. Alp.* 49. 141. *t.* 21. *f.* 1.

Sedi

Sedi species minima. *Gesn. fasc.* 24. *t.* 11. *f.* 30.
β. major, caule robustiore et altiore valdè villoso.
Habitat α in alpibus Helveticis, Austriacis, Pyrenaicis, Baldo; β in Lusitaniâ (*Gage*). ♃. (v. v. c. et s. sp.; β v. s. in Herb. Banks.)

Radix lignosa, ramosa. *Surculi* erecti, brevissimi, rigidissimi, cæspitem planum et valdè compactum formant. *Caules* plures, erecti, 2—3-pollicares, tenuitèr filiformes, rigidi, fragiles, oligophylli, multiflori, glabriusculi, fucati. *Folia* radicalia aggregata, imbricata, lineari-oblonga, obtusa, glabra, rigida, cretaceo-glauca, subtùs carinata, suprà convexa, foraminibus numerosis minutis perforata, basi angustata, ciliata, medio insignitèr recurvata: substantiâ frangibili crustaceâ; *caulina* pauca, sparsa, parva, squamæformia, adpressa. *Flores* lactei in paniculam parvam dispositi. *Pedicelli* in æstivatione decurvati, postremò erecti, *calyces*que pilis brevissimis glanduliferis parcè suppediti. *Laciniæ calycinæ* breves, latè ovatæ, obtusissimæ, obsoletè trinerves, margine membranaceæ. *Petala* rotundata, triplinervia (nervis lateralibus ramosis), basi unguiculata: limbo orbiculato, retuso, patenti. *Genitalia* corollâ breviora.

61. *S. diapensioides*, foliis linearibus strictis carinatis aggregato-imbricatis cretaceo-glaucis, caule polyphyllo paucifloro densè glanduloso-piloso, laciniis calycinis elliptico-oblongis.

S. diapensioides. *Bellardi Act. Acad. Taur.* v. *p.* 227. *ejusd. Append. ad Fl. Pedem. p.* 21. *t.* 3. *Sternb. Saxif. p.* 35. *t.* 9. (*mala.*)

S. cæsia, *β. Lam. Encycl.* vi. *p.* 676.

Habitat

Habitat in alpibus Pedemontanis et Helveticis. ♃. (v. s. in Herb. Lessertiano specim. in cacumine Cenis montis lecta.)

Planta densissimè cæspitosa. *Radix* lignosa. *Surculi* lignosi, semiunciales, erecti, conferti, creberrimè foliosi. *Caules* erecti, teretes, polyphylli, 2- rarissimè 3-pollicares, pilis patentibus glanduliferis undique densè tecti. *Folia* surculina linearia, obtusa, stricta, cretaceo-glauca, undique arctè aggregato-imbricata, glabra, subtùs obtusè carinata, margine cartilaginea, basi ciliata, apice punctis 1—2 perforata; caulina linearia, obtusa, densè glanduloso-pilosa, recta, sensìm parùm latiora. *Flores* 3—4 vel 5 in capitulum terminalem, campanulati, candidi, *S. cæsiâ* majores. *Pedicelli* breves calycesque pilis patentibus glanduliferis conferti. *Calycis laciniæ* elliptico-oblongæ, obtusæ. *Petala* basi angustata (unguiculata): limbo patente, orbiculato, 5-nervi. *Stamina* pistilla subæquantia; *filamenta* lutea; *antheræ* aureæ.

Obs. Habitu omninò *S. cæsiæ*, à quâ tamen abundè discrepat: foliis strictis, caule polyphyllo densè piloso paucifloro, floribus majoribus, laciniis calycinis elliptico-oblongis.

62. *S. fimbriata*, rosulis sphæricis, foliis appressè imbricatis orbiculato-obovatis: marginibus membranaceis ciliisque longis fimbriatis, pedunculo solitario nudo unifloro.

Habitat in Capite Newnham dicto ad oras occidentales Americæ borealis. *David Nelson.* ♃. (v. s. in Herb. Banks.)

Planta canescens cæspites planos patentes efficiens. *Rosulæ* confertissimæ sphæricæ. *Folia* appressè imbricata, obovata, trinervia, utrinque glabra, punctis pellucidis fenestrata, intùs concava, extùs convexa, apice orbiculata,

margine

margine membranâ scariosâ et ciliis longis cuspidatis inflexis fimbriata. *Pedunculus* solitarius, uncialis, uniflorus, nudus. *Calyx* obconicus : laciniæ brevè ovatæ, obtusæ, margine ciliatæ. *Petala* mihi ignota.

63. *S. serpyllifolia*, virens ; surculis repentibus, foliis ovatis obtusis petiolatis denudatis, caule filiformi oligophyllo unifloro, petalis orbiculatis : nervis ramosis.

S. serpyllifolia. *Pursh Amer. Septent.* i. *p.* 310.

Habitat in capite Newnham dicto, ad oras occidentales Americæ septentrionalis. *David Nelson.* ♃. (v. s. in Herb. Banks.)

Species distinctissima. *Planta* virens, patens, cæspitosa. *Surculi* ramosi, repentes, rigidi, densè foliosi. *Caules* plures, filiformes, graciles, erecti, 2—3-unciales, paucifolii, uniflori, rubescentes, fucati, glandulis brevissimis levitèr sparsi. *Folia* conferta, ovata, obtusa, petiolata, plana, recurvato-patentia, integerrima, utrinque glabra, viridia, nitida, impunctata : caulina linearia, obtusa, multò minora. *Flos* terminalis, magnus, aureus ? *Calyx* nitidus parcè glandulosus : laciniæ breves, latæ, obtusæ. *Petala* orbiculata, brevè unguiculata, triplinervia : nervis ramosis, rectiusculis. *Filamenta* brevia, lutescentia ? *Antheræ* flavæ ? *Styli* brevissimi.

64. *S. parnassifolia*, caule erecto folioso 3—4-floro, foliis cordatis amplexicaulibus glabris, petalis obovatis 5-nervibus.

Habitat in Nepaliæ alpibus. *Wallich.* ♃. (v. s. in Herb. Lamb.)

Species ab omnibus longè diversa, plantam minorem *Parnassiæ palustris* nè parùm refert. *Caules* plures, erecti, tripol-

tripollicares, teretes, glabri, rigidi, foliosi, 3—4-flori. *Folia* alterna, sessilia, cordata, amplexicaulia, obtusa, utrinque glabra, subtùs nervosa, margine glandulis levitèr ciliata. *Pedunculi* breves, uniflori, calycesque glandulis levitèr instructi. *Flores* lactei. *Laciniæ calycinæ* triangulari-ovatæ, mucronatæ, trinerves. *Petala* obovata, 5-nervia (nervis simplicibus rectiusculis), basi angustata. *Antheræ* croceæ.

65. *S. androsacea*, foliis radicalibus confertis ellipticis obtusis pilosis integerrimis tridentatisve, laciniis calycinis obtusissimis, petalis spathulatis, caule nudiusculo subbifloro.

S. androsacea. *Linn. Sp. Pl.* 571. *Gerard. Fl. Gall. Prov.* 423. *Jacq. Aust.* iv. *t.* 389. *Willd. Sp. Pl.* ii. *p.* 641. *Lam. Encycl.* vi. *p.* 674. *ejusd. Fl. Franc.* iii. *p.* 525. *Lam. et Decand. Fl. Franc.* iv. *p.* 367. *Persoon Synops.* i. *p.* 487. *Sternb. Saxif. p.* 42. *t.* 11. *f. a. Wahlenb. Carpath.* 116.

S. pyrenaica. *Scop. Carn. edit.* 2. 498.

S. foliis hirsutis ellipticis et tridentatis, caule paucifloro. *Hall. Helv.* 984. *Ibid. It. Helv. n.* 69. *p.* 292. *t.* 2.

S. alpina, Androsaces villosæ habitu. *Hall. Comm. Nor.* 1736. *t.* 1. *f.* 3.

Sedum alpinum tertium. *Col. Ecphr.* ii. *p.* 66 *et* 67. *f. ultima.*

Habitat in Helvetiâ, Austriâ, Carniolâ. ♃. (v. v. c.)

Planta densissimè cæspitosa habitu omninò *Androsaces. Radix* fibrosa. *Caules* erecti 2- rariùs 3-pollicares, nudiusculi, subbiflori, pilis glanduliferis articulatis patentibus tecti, sæpiùs foliis 1—2 muniti. *Folia* radicalia conferta, elliptica, obtusa, integra, rariùs tridentata, utrinque pilis articulatis instructa, basi in petiolum angustata, subtùs

subtùs conspicuè nervosa. *Pedicelli* brevissimi calycesque pube viscidâ suppediti. *Calyx* obturbinatus : laciniæ ovatæ, obtusissimæ, nervosæ. *Petala* spathulata, candida, triplinervia (nervis simplicibus, strictis), calyce ferè triplò longiora. *Filamenta* brevia, lutea. *Antheræ* flavæ.

66. *S. spathulata*, gemmifera ; surculis crebrè foliosis, foliis integerrimis spathulatis fimbriatis, laciniis calycis ovato-oblongis obtusis, petalis obovatis, caule nudiusculo subbifloro.

S. spathulata. *Desf. Atlant.* ii. *p.* 342. *t.* 96. *f.* 2. *Lam. Encycl.* vi. *p.* 692. *Persoon Synop.* i. *p.* 489. *Sternb. Saxif. p.* 58.

Habitat in Atlantis cacumine propè Belide. *Desfontaines.* ♃. (v. s. in Herb. Lessertiano specim. à Clariss. Desfontaines communicata.)

Planta densè cæspitosa. *Surculi* plures, breves, procumbentes, creberrimè foliosi, foliis emarcidis ad eorum bases persistentibus. *Caules* erecti, teretes, capillares, 1—2½-pollicares, nudiusculi, pilis brevissimis raris adspersi, 1—3-pluri-flori è flosculis lateralibus sæpiùs abortientibus (caule unifloro) ferè semper orti. *Folia* parva, spathulata, integerrima, fimbriata : laminâ orbiculatâ, basi in petiolum brevissimum angustatâ ; nonnulla trifida lobis acutiusculis necnon vidi. *Pedicelli* calycesque pube brevissimâ parcè suppediti. *Laciniæ calycinæ* ovato-oblongæ, obtusæ. *Petala* obovata, triplinervia, lactea, calyce longiora. *Genitalia* petalis breviora. *Stamina* inæqualia ; *filamenta* lutescentia ; *antheræ* aureæ.

Obs. Facie *S. globuliferæ*, sed ab eâ satìs distincta. Forsàn ad ultimam sectionem meliùs relata esset.

67. *S. Sedioides*, caulibus erectiusculis, foliis lineari-lanceolatis acutis glabris, pedunculis elongatis capillaribus unifloris, petalis linearibus mucronulatis calycem subæquantibus.

S. Sedioides. *Linn. Sp. Pl.* 572. *Jacq. Misc.* ii. *p.* 134. *t.* 21. *f.* 22. (*optima.*) *Willd. Sp. Pl.* ii. *p.* 642. (exclus. syn. *Allion. Ped.*) *Lapeyr. Pyren. Saxif. p.* 47. *Lam. Encycl.* vi. *p.* 675. (exclus. syn. *Allion. Ped.*) *Persoon Synop.* i. *p.* 488. *Sternb. Saxif. p.* 27. *t.* 7. *f.* α *et* β. (*malæ.*) *et t.* 9. β.

Saxif. trichoides. *Scop. Carn.* 496. *t.* 15. (*bona.*)

S. Hohenwartii. *Sternb. Saxif. p.* 26. *t.* 7.

S. Seguierii. *ejusd. t.* 9. β.

S. alpina minima, foliis lingulatis in orbem actis, flore ochroleuco. *Segu. Veron.* 450. *t.* 9. *f.* 3. (*pessima.*)

S. alpina muscoides, foliis superioribus oblongis, inferior. rotundioribus et circumactis. *Segu. Veron.* iii. *p.* 203. *t.* 5. *f.* 3. (*bona.*)

β. *colorata*, petalis antherisque purpurascentibus.

S. Hohenwartii β. *Sternb. Saxif. p.* 26. *t.* 9. β.

γ. *aphylla*, foliis inferioribus sæpè trifidis.

S. aphylla. *Sternb. l. c. p.* 40. *t.* 11. β.

S. muscoides. *Wahlenb. Carpath.* 122.

Habitat α in alpibus Tridentinis, Carinthiacis, Carniolicis, Salisburgens., Pyrenaicis, Arragonicis, Baldo; β et γ in alpibus Austriacis. ♃. (v. s.)

Planta cæspitosa, lætè virens, tenera. *Radix* fibrosa, capillacea. *Caules* numerosi, adscendentes, debiles, valdè foliosi, sesqui- vel bi-pollicis longi, glandulis brevissimis levitèr adspersi. *Folia* ima aggregata, spathulata, patentia; superiora erecta, lineari-lanceolata, acuta, alterna; omnia lætè viridia utrinque glabra, nitida, conspicuè trinervia,

trinervia, margine glandulis ciliata. *Pedunculi* elongati, capillares, uniflori, terminales, glandulis minutis adspersi. *Flores* minimi, lutescentes. *Laciniæ calycinæ* ovatæ, obtusiusculæ, trinerves. *Petala* parva, linearia, mucronulata, calycem vix excedentia, trinervia: nervis parallelis simplicibus. *Filamenta* brevissima, lutea. *Antheræ* flavæ.

The present species is readily distinguished by its slender habit and numerous ascending leafy stems, of a beautiful green, which are furnished with a few thin and scattered, short, glandular hairs; by its long, slender, capillary peduncles; and lastly, by its small, linear, pointed petals, scarcely exceeding the length of the calyx. I regret having been obliged to differ so widely in opinion from the Count de Sternberg, who certainly has not studied the present species with due care, as is evident from his description and figures, both of which are miserably defective in point of botanical accuracy. The following species, *S. tenera*, is distinguished from this, to which it is nearly related, by its much more tufted habit; by its obtuse leaves, which, together with the stems, are thickly clothed with glandular hairs; by the oblong laciniæ of its calyx; and in having the flowers double the size, with obovate, retuse petals, nearly twice the length of the calyx. In the figures of *S. sedioides* given by Sternberg, the petals are erroneously exhibited as obovate; and were it not for the habit, which is clearly that of *S. sedioides*, I should certainly have been inclined to refer them to the following species. The figure given by him under the name of *S. Hohenwartii* shows the flowers much more correctly. The variety β I have not seen: it therefore rests wholly on the authority of Sternberg, who states the petals and anthers to be of a purplish colour. The varieties I have marked agree with *S. sedioides* in every essential point; but how far they are to be regarded as permanent varieties I have not had opportunities of determining.

68. *S. te-*

68. S. *tenera*, surculis brevibus crebrè foliosis, foliis lineari-oblongis obtusis caulibusque glanduloso-pilosis, laciniis calycinis oblongo-ovatis, petalis obovatis retusis calycem superantibus.

S. tenera. *Sut. Fl. Helv.* i. *p.* 245. *Vill. Delph.* iii. *p.* 666. *Sternb. Saxif. p.* 28. *t.* 9. *f.* 4.

S. planifolia. *Lapeyr. Pyren. Saxif. p.* 31. *Lam. Encycl.* vi. *p.* 677. *Lam. et Decand. Fl. Franc.* iv. *p.* 367. *Sternb. Saxif. p.* 28. *t.* 7. *f.* 3. (*mala.*)

S. muscoides. *Allion. Ped.* 1528. *t.* 61. *f.* 2. (exclus. synon.)

S. foliis mollibus ellipticis subhirsutis, caule paucifloro. *Hall. Helv. n.* 985.

S. alpina pallidè lutea, foliis latiusculis non incisis, radice crassâ. *Mich. Pl. Rom. et Neapol.* 829.

Sedum alpinum, tertio simile alterum. *Colum.* ii. *p.* 66. *et* 67. *f. ad dextram.*

Habitat in alpibus Helveticis, Pedemontanis, Pyrenæorum, et in Monte Cenisio. ♃. (v. s. specim. quæ Clariss. Kunth mihi benevolè dedit.)

Herba densissimè cæspitosa. *Surculi* brevissimi sæpiùs tamen unciales aut ultra, creberrimè foliosi, ad basin foliis emarcidis aggregato-imbricatis. *Caules* capillares, 1—2-pollicares, erecti, simplicissimi, 1—3-flori, pilis glanduliferis brevibus undique densè tecti. *Folia* radicalia et surculina lineari-oblonga, obtusa, conferta, mollia, utrinque pilis brevibus glanduliferis tecta; caulina ovali-oblonga, in cæteris, radicalibus similia. *Flores* ochroleuci *S. sedioidi* duplò majores. *Calyces* obconici, densè glanduloso-tomentosi: laciniæ oblongo-ovatæ, obtusæ. *Petala* obovata, retusa, calycem ferè duplò excedentia,

tripli-

triplinervia: nervis simplicibus; lateralibus incurvis; medio recto. *Stamina* subæqualia; *filamenta* lutescentia; *antheræ* aureæ. *Styli* graciles, recti, stamina subæquantes.

Obs. A *S. sedioide* facilè distinguitur: foliis cauleque densè glanduloso-pilosis, petalis obovatis retusis calycem duplò excedentibus.

An examination of specimens of the *S. tenera* of Suter, and of the *S. planifolia* of La Peyrouse, prove that they are the same; not even varieties: I have therefore preferred that of Suter as being the less objectionable name.

§. *Foliis 5—3-partitis petiolatis.*

69. *S. geranioides,* foliis reniformibus 3—5-lobo-palmatis pubescentibus longè-petiolatis: segmentis cuneatis inciso-dentatis, paniculâ coarctatâ multiflorâ, laciniis calycinis lineari-lanceolatis obtusis, petalis oblongis planis.

S. geranioides. *Linn. Sp. Pl.* 578. *Amæn. Acad.* iv. *p.* 271. *Willd. Sp. Pl.* ii. *p.* 652. (exclus. synon. *Gmel. Sib.*) *Lapeyr. Pyren. Saxif. p.* 66. *t.* 43. (*bona.*) *Lam. Encycl.* vi. *p.* 691. *Lam. et Decand. Fl. Franc.* iv. *p.* 372. *Persoon Synop.* i. *p.* 489. *Hort. Kew.* iii. *p.* 70. *Sternb. Saxif. p.* 49.

S. quinquefida. *Lam. Franc.* iii. *p.* 533.

S. foliis radicalibus palmato-quinquelobis trifidis; lateralibus coalescentibus; rameis subulatis, laciniis calycinis dilatatis. *Gouan Illust.* 28. *t.* 18. *f.* 2.

S. pyrenaica, tridactylites latifolia. *Tournef. Inst.* 253.

Habitat in Pyrenæis. ♃. (v. v. c.)

Planta densè cæspitosa. *Radix* sublignosa, rudimentis foliorum emarcidorum suprà densè instructa. *Surculi* breves, conferti,

conferti, rigidi, erecti, rubescentes. *Caules* erecti, palmares, rigidi, rubri, pilis glanduliferis undique instructi. *Folia* radicalia longè petiolata, erecta, 3—5-lobo-palmata, cucullata, utrinque pube brevi densâ valdè glutinosâ densè obsita: lobi cuneati, inciso-dentati: dentibus magnis obtusis; *caulina* pauca sessilia inferiora digitata; superiora indivisa: segmentis lanceolatis. *Petioli* semiteretes, pilis viscidis suppediti. *Panicula* coarctata, multiflora. *Bracteæ* lanceolatæ, integræ, obtusæ. *Flores* campanulati, candidi. *Calyces* ut et pedicelli pube glutinosâ omninò tecti: laciniæ lineari-lanceolatæ, trinerves, apice reflexæ, obtusæ. *Petala* oblonga, triplinervia: nervis simplicibus, strictis. *Stamina* inæqualia; *filamenta* elongata, lutescentia; *antheræ* aureæ. *Styli* breves, staminibus duplò breviores.

70. *S. irrigua*, foliis villosis; radicalibus 5-partito-palmatis longè petiolatis; caulinis digitatis: segmentis cuneato-oblongis mucronatis trifidis, paniculâ laxâ, laciniis calycinis linearibus acutis, petalis spathulatis.

S. irrigua. *Fisch. Hort. Gorenk. Spreng. Cent. Spec. minus cognit. p.* 36. *Marsch. à Bieberst. Cent. Plant. Rar. Rossic.* ii. *t.* 73. *Steven de Saxif. Cauc. in Mem. Mosq.* iv. *p.* 82. *n.* 12. *Sternb. Saxif. p.* 60.

S. petræa. *Pall. Ind. Taur. Habl. Taur. p.* 147.

S. aquatica. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 317. (exclus. synon. *Lapeyr. et Persoon.*)

S. foliis radicalibus reniformibus 5-lobis multifidis; caulinis linearibus, caule subnudo. *Gmel. Sib.* iv. *p.* 171. (exclus. synon. *Linn.*)

Habitat in Tauriâ inter rupes ad fontes Salghir (*Pallas, Marschall à Bieberstein*), in Sibiriâ nempè in udis pratis sylvosis

sylvosis ab Aldano ad Urak (*Gmelin*), in altissimis præruptis Jaikæ (*Pallas*). ♃. (v. v. c. et s. sp. in Herb. Pallas. nunc Lamb.)

Planta cæspitosa, herbacea, magnitudine præcedentis at multò mollior et laxior, nunquam surculosa. *Caules* erecti, palmares, flexiliores, villis articulatis suppediti, virides. *Folia* radicalia cucullata, reniformia, 5-partito-palmata, longè petiolata; caulina trifida sessilia: *segmenta* radicalium cuneato-oblonga, trifida: lobis tridentatis: dentibus acutis, aristatis; caulinorum lanceolata, indivisa, mucronata. *Petioli* semiteretes longissimi, lenti, erecti, suprà canaliculati, undique villis longis, articulatis, viscidis densè tecti. *Panicula* laxa, multiflora. *Bracteæ* palmatæ. *Flores* majores, campanulati, pulchri, candidi. *Calyces* cum *pedunculis* villis viscidis instructi: laciniæ lineares, acutæ, intùs concavæ. *Petala* spathulata, triplinervia: nervis simplicibus, rectis. *Stamina* inæqualia; *filamenta* viridia; *antheræ* luteæ. *Styli* elongati, staminibus subæquales.

This is a very distinct and well-marked species, readily distinguished from the preceding by its loose, herbaceous habit, slightly covered with long villous hairs; leaves much more deeply divided; lobes acute; stem limber, green, villous. Panicles loose, many-flowered; *laciniæ* of the calyx acute; petals broader, spathulate; limb spreading. Marschall von Bieberstein in his Supplement to the *Flora Taurico-Caucasica* mentions the petals as being unequal, and slightly three-toothed at the apex; but these marks are by no means constant; for I have never observed them either in cultivated or in dried specimens.

 71. *S. ma-*

71. *S. maderensis*, surculis lignosis, foliis confertis cuneiformibus longè-petiolatis basi acutis apice inæqualitèr inciso-lobatis, laciniis calycinis latè ovatis acutis.

Habitat in Ins. Madeira. *Masson.* ♃. (v. s. in Herb. Banks.)

Planta densè cæspitosa. *Surculi* erecti, rigidi, lignosi, basi rudimentis foliorum emarcidorum crebrè instructi. *Caules* plures, adscendentes, 4-unciales, filiformes, graciles, oligophylli, pauciflori, pilis brevissimis glanduliferis levitèr sparsi. *Folia* radicalia conferta, cuneiformia, longè petiolata, pubescentia, basi acuta, apice inæqualitèr inciso-lobata: lobis brevè ovatis, acutis; caulina inferiora palmata; superiora indivisa, acuta. *Petioli* filiformibus, teretibus, rigidis, levitèr villis ciliati. *Calyx* obconicus, ut et *pedicelli* pube glutinosâ tectus: laciniæ triangulari-ovatæ, acutæ. *Petala* non vidi.

72. *S. pedatifida*, foliis radicalibus reniformibus pedatifidis viscidis subvillosis: segmentis lineari-lanceolatis acutis, paniculâ fastigiatâ, laciniis calycinis lineari-lanceolatis mucronatis, petalis angustè spathulatis.

S. pedatifida. *Ehrh. Exsicc. n.* 15. *Smith in Act. Soc. Linn.* x. *p.* 340. *Engl. Bot. t.* 1278. (*optima.*) *Compend. Fl. Brit. p.* 67.

S. quinquefida, *var. Lam. Fl. Fr.* iii. *p.* 533?

β. ladanifera, glabra; foliis profundiùs sectis cauleque glutinosis.

S. ladanifera. *Lapeyr. Saxif. Pyren. p.* 65. *t.* 42. *Lam. Encycl.* vi. *p.* 691. *Lam. et Decand. Fl. Franc.* iv. *p.* 373. *Persoon Syn.* i. *p.* 490.

Habitat α in Helvetiæ alpibus (*Ehrhart*), in Pyrenæis (*Tournefort*), in rupibus Scotiæ montium (*G. Don et J. Mackay*); β in Pyrenæis, *La Peyr.* ♃. (v. v. c. et s. sp. α et β.)

Herba

Herba in cæspitibus densis, conicis, vegetans, villis mollibus præsertìm folia et petioli, instructa; et tota succo glutinoso tecta, in β (quæ nuda est) densiore et ladano simili nitido, et e quo venit gratus et subtilis odor, spirare quem memorat Clariss. La Peyrouse, et ipse observavi. *Surculi* erecti, sublignosi, 3—4-pollicares, basi rudimentis foliorum emarcidorum tecti. *Caules* erecti, palmares, glabriusculi, rubri, nitidi. *Petioli* longi, compressi, villosi (in β nudi), basi dilatati et caulem amplexantes. *Folia* radicalia numerosa; adultiora patentia; juniora erecta; omnia profundè tripartita: segmentis lateralibus 2—3-fidis, intermedio cuneato-trifido vel integerrimo: lobis lineari-lanceolatis acutis aristatisque; *caulina* brevè petiolata, profundè tripartita: segmentis linearibus integerrimis; supremis et rameis simplicibus, lineari-lanceolatis, acutis. *Paniculæ* confertæ, fastigiatæ, multifloræ. *Pedicelli calyces*que pube brevissimâ glutinosâ tecti. *Flores* campanulati, candidi, *S. geranioide* multò minores: limbo patènte. *Calycis laciniæ* lineari-lanceolatæ, mucronatæ: mucrone aristato, inflexo. *Petala* angustè spathulata, triplinervia: nervis simplicibus. *Stamina* pistillis subæqualia; *filamenta* pallidè luteo-virescentia: *antheræ* aureæ.

Obs. Species ab omnibus satis distincta. Plures Botanici cum *S. geranioide*, cui in pluribus sed præsertìm habitu convenit, confusi sunt; tamen characteribus indicatis ab eâ etiam abundè discrepat. Var. β parùm in habitu recedit, et ferè villorum absentiâ nec non succo ladano simili densiùs tecto; sed ut species diversa nequaquam habenda sit.

 73. *S. ce-*

73. *S. ceratophylla*, surculis lignosis, foliis bi- tri-partitis petiolisque rigidis glabris: segmentis subulatis corneo-mucronatis, caule glutinoso, calycibus fucatis glabris: laciniis ovatis apice recurvis mucronatis, petalis oblongis.

S. ceratophylla. *Dryander in Hort. Kew.* iii. *p.* 70.

S. trifurcata. *Schrad. Hort. Gött. fasc.* i. *p.* 13. *t.* 7. *Sternb. Saxif. p.* 49.

S. petræa. *Herb. Pavon.*

Habitat in Hispaniâ. *Pavon.* ♃. (v. v. c. et s. spont. à Clar. Pavon comm. in Herb. Lamb.)

Planta densè cæspitosa, tota glaberrima. *Surculi* numerosi, breves, lignosi, stricti, rigidissimi, fragiles. *Caules* numerosi, erecti, palmares, ramosi, rigidi, fragiles, basi rubescentes, succo viscido undique fucati. *Petioli* longissimi, filiformes, rigidi, fragiles, nudi, suprà canaliculati. *Folia* profundè bi- tri-partita, carnosa, glaberrima: segmentis subulatis, divaricatis, suprà canaliculatis, apice mucrone corneo, recurvo instructis; caulina petiolata, tripartita: segmentis simplicibus. *Flores* numerosi, candidissimi, in paniculam ramosam laxam dispositi. *Calyces* urceolati pedicellique succo viscoso undique obsiti et nitidissimè fucati: laciniæ ovatæ, erectæ, conniventes, extùs convexæ, margine membranaceæ, apice mucrone corneo recurvato instructæ. *Petala* oblonga, obtusa, integerrima, demùm flaccida, triplinervia: nervis simplicibus strictis.

74. *S. obtusifida*, surculis lignosis, foliis tripartitis petiolisque angustissimis rigidis glabris: segmentis linearibus obtusissimis, calycibus pubescentibus: laciniis ovatis obtusis, petalis obovatis.

Habitat in Hispaniâ. *Pavon.* ♃. (v.s. in Herb. Pavon. nunc Lamb.)

Planta

Planta densissimè cæspitosa, glaberrima, intensè viridis. *Surculi* erecti, 1- aut 1½-pollicares, lignosi, rigidi, foliosi. *Caules* erecti, 4-unciales, oligophylli, glabri, 4—5-flori. *Petioli* angustissimi, simplices, glabri, subtùs carinati, rigidissimi. *Folia* profundè tripartita: segmenta linearia, obtusissima, glabra, nitida; lateralibus porrectis, distantibus, sæpiùs bifidis. *Pedicelli* uniflori, pubescentes. *Flores* campanulati, albi. *Calyx* pubescens: laciniis ovatis, obtusis. *Petala* integerrima, obovata, triplinervia: nervis apice bi- vel tri-furcatis. *Stamina* stylos æquantia; *filamenta* lutescentia; *antheræ* flavæ.

Obs. Species distinctissima, præcedentis habitu.

75. S. *ajugifolia*, surculis procumbentibus, foliis 5-partitis; segmentis lanceolatis mucronatis, caule ramoso, laciniis calycinis ovatis mucronatis, petalis planis obovatis.

S. ajugifolia. *Linn. Amœn. Acad.* iv. *p.* 271. *Sp. Pl.* 578. *Gerard. Fl. Galloprov. p.* 224. *Willd. Sp. Pl.* ii. *p.* 653. *Lapeyr. Fl. Pyren. Saxif. p.* 56. *t.* 31. (*mala.*) *Lam. Encycl.* vi. *p.* 692. *Lam. et. Decand. Fl. Franc.* iv. *p.* 371. *Persoon Synop.* i. *p.* 489. *Hort. Kew.* iii. *p.* 70. *Sternb. Saxif. p.* 46. *Wahlenb. Carpath.* 122.

Habitat in Galloprovinciæ montibus, et etiam in Pyrenæis. ♃. (v. v. c.)

Herba virens, villis mollibus, raris, viscidis ad petiolos densioribus instructa, ante anthesin densè cæspitosa, postmodò laxa, surculosa. *Surculi* elongati, laxè procumbentes, rubescentes. *Caules* adscendentes, 4—6-unciales, ramosi, flexuosi, multiflori, villis viscidis levitèr adspersi, basi rubescentes. *Folia* radicalia et surculina longè petiolata, profundè 5-partita: segmentis lanceolatis, recurvatè mucronatis, divaricatis, utrinque glabris, margine ciliatis;

ciliatis; caulina omnia indivisa, lanceolata, acuminata. *Flores* magni, campanulati, albi. *Calyces* pedicellique pilis glanduliferis obsiti: laciniæ ovatæ, trinerves, mucronatæ, mucrone recurvo. *Petala* obovata, triplinervia: nervis simplicibus, rectiusculis.

76. *S. affinis*, surculis procumbentibus, foliis 5-partitis: segmentis linearibus mucronatis, laciniis calycinis linearibus aristatis, petalis oblongis: marginibus inflexis.

Habitat . . . . ♃. (v. v. c.)

Herba jucundè virens, villis mollibus et viscidis adspersa, ante anthesin densè cæspitosa, posteà laxa, surculosa. *Surculi* procumbentes, elongati, rubescentes, villis viscidis parcè instructi. *Caules* adscendentes, tripollicares, læves, nitidi, pauciflori. *Folia* radicalia 5-partita, surculina plerumque tripartita: segmenta linearia, mucronata: mucrone recurvo aristato; caulina omnia indivisa, linearia, mucronata. *Pedicelli* elongati, uniflori, calycesque pube viscidâ obsiti. *Flores* albi præcedente minores. *Calycis laciniæ* lineares, trinerves, aristatæ. *Petala* oblonga, triplinervia, margine inflexa: nervis rectiusculis, simplicibus.

I first noticed this species in the Royal Botanic Garden at Edinburgh, where the zeal and industry of my esteemed friend Mr. Macnab has brought together so many rarities. There I observed it for several years successively; and having since seen it in several collections about London, I am convinced of its being sufficiently distinct from its nearest ally *S. ajugifolia*, with which it is not unfrequently confounded. Both it and *ajugifolia* being cultivated together in the Edinburgh Botanic Garden, on comparing them I found the following, and which subsequent obser-

observations have led me to consider permanent, marks. *S. affinis* is a much smaller and slenderer plant, and of a more lively green colour. *Segments* of the leaves narrow, linear. *Stems* much slenderer and shorter, few-flowered. *Laciniæ* of the calyx linear, terminated with a long point. *Petals* oblong, with their margins inflected. This curious conformation of the petals is of itself an important differential mark; for in this respect it stands isolated among the numerous species which surround it, as *Rosa involuta* does among those of its tribe.

77. *S. pentadactyla*, surculis erectis brevibus, foliis longè-petiolatis glabris quinquepartitis: segmentis linearibus obtusis subtùs costatis, laciniis calycinis lanceolatis acutis, petalis obovatis: nervis ramosis.

S. pentadactylis. *Lapeyr. Fl. Pyren. Saxif. p.*64. *t.*40. *Lam. Encycl.* vi. *p.*696. *Lam. et Decand. Fl. Franc.* iv. *p.*374. *Persoon Synop.* i. *p.* 489.

Habitat in Pyrenæis. *La Peyrouse.* ♃. (v. s. in Herb. Banks.)

Herba glabra, lætè-virens, densè cæspitosa. *Surculi* erecti, breves, parùm lignosi, rigidi. *Caules* erecti, 3—5-unciales, ramosi, teretes, glabri, flexuosi. *Petioli* longissimi, compressi, lineares, glabri, subtùs costati, rigidiusculi. *Folia* radicalia brevissimè petiolata, patentia, surculina longè-petiolata, erecta, omnia profundè 5-partita: segmenta linearia, obtusa, patentia, subtùs costata. *Flores* candidi, in paniculam laxam dispositi. *Pedicelli* elongati calycesque glabri. *Laciniæ calycinæ* lanceolatæ, acutæ, trinerves. *Petala* obovata, triplinervia: nervis flexuosis ramosis. *Filamenta* gracilia, stylis elongatis breviora.

This species is very nearly related, on the one hand, to my *S. obtusifida*, and on the other to *S. exarata*; but having only seen imperfect

imperfect specimens of it, I am unable to decide positively to which of the two it is nearest allied. It appears to be nearer akin to *S. obtusifida;* still, however, I think they are specifically different. At the suggestion of Sir James Edward Smith, I have taken the liberty of changing the termination of the specific name, as being less consonant to established rules.

78. *S. latifida*, surculis erectis brevibus, foliis radicalibus surculinisque latè-cuneatis glaberrimis 3—5-lobis: lobis latè-ovatis acutis, calycibus glabris: laciniis ovato-lanceolatis mucronulatis, petalis spathulatis: nervis simplicibus.

S. adscendens. *Herb. Pavon.*

Habitat in Hispaniâ. *Pavon.* ♃. (v. s. in Herb. Lamb.)

Planta glaberrima, lætè-virens, cæspitosa. *Surculi* erecti, 2-pollicares, rigidiusculi. *Caules* erecti, palmares, ramosi, glabri, polyphylli, multiflori. *Folia* radicalia et surculina latè-cuneata, glaberrima, 3—5-loba: lobis latè-ovatis, mucronulatis, planis; caulina inferiora conformia sed profundiùs lobata: lobis lanceolatis; superiora indivisa. *Pedunculi* elongati, subbiflori, glabri. *Calyces* glabri: laciniæ ovato-lanceolatæ, mucronulatæ. *Petala* spathulata, candida, triplinervia: nervis simplicibus. *Stamina* pistillis breviora; *filamenta* lutescentia; *antheræ* aureæ.

79. *S. decipiens*, villosissima; foliis 5-fidis trifidisve: segmentis ovato-oblongis obtusis muticis, laciniis calycinis triangulari-ovatis obtusis muticis, petalis orbiculatis.

S. decipiens. *Ehrhart. Beytr.* v. *p.* 47. *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 55. *t.* 23.

S. cæspitosa. *Fl. Dan. t.* 71.

S. petræa.

S. petræa. *Roth Tent.* i. *p.* 184. *With. Brit.* 890.

S. palmata. *Smith Brit.* ii. *p.* 456. *Eng. Bot. t.* 455.

S. villosa. *Willd. Enum.* 462.

Habitat in apricis saxosis Germaniæ (*Ehrhart, Schreber, Panzer*), in rupibus Cambro-Britanniæ (*Griffith*), Bohemiæ (*Sternberg*). ♃. (v. v. c.)

Herba villosissima, canescens, ante anthesin densè cæspitosa, postmodò laxa, surculosa. *Surculi* elongati, procumbentes. *Caules* erecti, foliosi, multiflori, 4—6-unciales. *Folia* radicalia 5-fida vel trifida: segmenta latè oblongo-ovata, obtusa, mutica; caulina ima sæpiùs partita; superiora indivisa, lanceolata. *Flores* magni, patentes, lactei. *Calyces* pedunculique pube canâ viscidâ densè tecti: laciniæ triangulari-ovatæ, obtusæ, muticæ, obsoletè trinervosæ. *Petala* plana, orbiculata, integerrima, triplinervia: nervis simplicibus, rectiusculis.

80. *S. hirta*, villosissima; foliis radicalibus 5-fidis; surculinis trifidis: segmentis ovato-lanceolatis acutis, laciniis calycinis triangulari-ovatis acutis, petalis obovatis.

S. hirta. *Donn Cant. ed.* 5. 107. *Engl. Bot. t.* 2291. *Smith Compend. Fl. Brit. p.* 66.

Habitat in rupibus Hiberniæ (*J. T. Mackay*), Scotiæ occidentalis (*G. Don*). ♃. (v. v. c. et s. spont.)

Herba villosissima, canescens, ante anthesin densissimè cæspitosa, posteà laxa, surculosa. *Surculi* decumbentes, flexuosi. *Caules* erecti, 3—5-pollicares, polyphylli, pauciflori, villis viscidis densè instructi, basi rubescentes. *Folia* radicalia 5-fida; surculina trifida petiolis dilatatis subæqualia: segmenta ovato-lanceolata, acuta; *caulina* inferiora profundè tripartita: segmentis linearibus, mucronatis;

cronatis; superiora indivisa. *Flores* albi, præcedente minores. *Calyces* pedicellique pilis glanduliferis confertissimè tecti: laciniæ latè triangulari-ovatæ, mucronatè acutæ. *Petala* obovata, integra, triplinervia: nervis simplicibus, strictis. *Stamina* stylos subæquantia; *filamenta* flavida; *antheræ* luteæ.

Sir J. E. Smith has justly remarked in English Botany, that this species approaches very near to *S. decipiens* (*palmata*, Sm.); still, however, I think with him that it is specifically distinct. It differs from *decipiens* in its less robust habit, acute segments of its leaves, and acute laciniæ of its calyx, its smaller flowers, and obovate petals. My friend Mr. J. T. Mackay first discovered this species on the Irish mountains. It has also been observed by the late Mr. G. Don of Forfar, on rocks in the Western Highlands. The Scottish specimens in Mr. Don's Herbarium agree exactly with Irish ones from Mr. Mackay, and with the admirable figure in English Botany.

81. *S. platipetala*, villosa; surculis elongatis, foliis 5—3-partitis: segmentis linearibus acutis aristatisque, laciniis calycinis ovatis mucronatis, petalis orbiculatis.

S. platipetala. *Smith in Act. Soc. Linn.* x. *p.* 391. *Engl. Bot. t.* 2276. (*optima.*) *Compend. Fl. Brit.* 66.

Habitat in Scotiæ alpibus, *G. Don*; in alpibus Cambro-Britannicis, *Dawson Turner.* ♃. (v. v. spont.)

Herba villosa, ante anthesin densissimè cæspitosa, posteà laxè diffusa, surculosa. *Surculi* numerosi, longissimi, prostrati. *Caules* erecti, 5—6-unciales, foliosi, multiflori. *Folia* radicalia profundè partita; surculina tri- rariùs quinque-partita, petiolis angustè linearibus duplò vel triplò breviora: segmenta linearia, acuta, setâ longâ tenui terminata;

terminata; *caulina* inferiora profundè 5-partita; superiora indivisa, lanceolata, acuminata. *Flores* patentes, lactei, majusculi. *Calyces* pedunculique pube glandulosâ densè suppediti: laciniæ triangulari-ovatæ, mucronatæ (mucrone recto), conspicuè trinerves. *Petala* orbiculata, plana, integra, extùs præsertìm in æstivatione, ad apicem rosea, basi parùm angustiora, triplinervia: nervis lateralibus incurvis, ramulosis; medio recto, simplici. *Stamina* æqualia, stylis vix longiora; *filamenta* pallida; *antheræ* luteæ.

82. *S. incurvifolia*, glabriuscula; foliis radicalibus 5-fidis; surculinis trifidis: segmentis lanceolatis obtusis incurvis, laciniis calycinis ovatis acutis, petalis subrotundis emarginatis.

S. incurva. *Mackay in literis.*

Habitat in Hiberniæ rupibus alpinis. *J. T. Mackay.* ♃. (v. v. c.)

Planta virens, densissimè cæspitosa, ante anthesin glaberrima, postmodùm villis longis viscidis adspersa. *Surculi* breves, erecti. *Caules* stricti, tripollicares, foliosi, 2—3-flori. *Folia* radicalia aggregata, 5-fida, palmata; surculina trifida petiolis latè dilatatis vix breviora: segmenta lanceolata, obtusa, incurvata; *caulina* inferiora palmatifida; superiora indivisa. *Flores* albi. *Calyces* pedicellique pilis glanduliferis suppediti: laciniæ latè ovatæ, acutæ, muticæ. *Petala* subrotunda, emarginata, triplinervia: nervis simplicibus.

The present species has, I believe, been found no where else except in Ireland. Having cultivated it for many years, I do

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not hesitate to give it with confidence as a distinct species. Its short upright shoots; its inflected leaves, and emarginate petals; its stems never bearing above two or three flowers; and lastly, its being nearly smooth, will always prevent its being confounded with the three preceding species. In some respects, but especially in habit, it approaches near to *S. cæspitosa*, Linn. It differs however from it by its emarginate petals; by the longer and inflected segments of its leaves; and likewise by the whole plant being almost smooth, and nearly double the size.

83. *S. denudata*, glaberrima; foliis radicalibus 5-fidis; surculinis tripartitis: segmentis lineari-subulatis acutis, laciniis calycinis lanceolatis mucronulatis, petalis obovatis emarginatis.

Habitat in montibus Grampianis in Angusiâ Scotiæ. *G. Don.* ♃. (v. v. spont.)

Herba glaberrima, lætè viridis, in cæspitibus densis parvis vegetans. *Surculi* brevissimi, conferti, erecti, crebrè foliosi. *Caules* erecti, sesquipollicares, oligophylli, subbiflori, purpurascentes, pilis glandulosis levitèr instructi. *Folia* radicalia 5-fida; surculina tripartita: segmenta lineari-subulata, acuta, aristâ terminata, carnosa, glabra, nitida; *caulina* ima tripartita, cæteris indivisis. *Flores* campanulati, candidi. *Calyces* pilis glanduliferis parcè suppediti: laciniæ lanceolatæ, mucronulatæ mucronulo reflexo. *Petala* obovata, emarginata, trinervia: nervis simplicibus strictis. *Filamenta* luteo-virescentia. *Antheræ* aureæ.

The late Mr. G. Don discovered this species many years ago on rocks on the summits of the mountains of Angus, near the confines of Aberdeenshire, where it grows in little dense tufts, flower-

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ing in June. The stem has never more than one or two flowers. The leaves are quite smooth and shining, except the petioles, which are slightly fringed with soft villous hairs. The narrower segments of its leaves, which are acute, straight and awned, and the lanceolate laciniæ of its calyx, as well as its obovate petals, at once distinguish it from *S. incurvifolia*. It cannot be confounded with *S. cæspitosa*, as will be seen on a comparison of their characters. The late Mr. Don cultivated it under the name of *S. lævis*; but it is very distinct from the *lævis* known in the gardens, which is the *S. condensata* of Gmelin's *Fl. Badensis*.

84. *S. Sternbergii*, glabra; foliis radicalibus palmatifidis; surculinis trifidis indivisisve: lobis ovatis acutis muticis, laciniis calycinis ovatis mucronatis, petalis obovatis: nervis ramosissimis.

S. Sternbergii. *Willd. Enum. p.* 462. *Sternb. Saxif. p.* 56. *t.* 24. (*mala.*)

S. palmata. *Panz. in Sturm. Deutsch. Fl.* 26. *Heft. t.* 10. *f.* 2. (*ex Sternb. l. c.*)

Habitat in Agro Norimbergensi Germaniæ. *Panzer.* ♃. (v. v. c.)

Herba lætè virens, glaberrima, densè cæspitosa. *Surculi* brevissimi, conferti. *Caules* erecti, 3—4-unciales, glabri, 2—3- rariùs 4-flori. *Folia* radicalia 5-fida, palmata; surculina trifida aut indivisa: lobis ovatis acutis muticis; *caulina* omnia indivisa, cuneata, acuta, glabra, nitida, conspicuè nervosa. *Flores* magni, albi. *Calyces* pedicellique pilis glanduliferis brevissimis adspersi: laciniæ ovatæ mucronatæ trinerves: mucrone recurvo. *Petala* obovata, triplinervia: nervis flexuosis, ramosissimis.

OBS.

Obs. Figura Sternbergii, quæ dubia ob habitum diversum et caulem ramosum hirsutum, ad *S. decipientem* potiùs spectare videtur.

85. *S. pulchella*, glabra; foliis radicalibus 5-fidis; surculinis trifidis: segmentis linearibus obtusis, laciniis calycinis latè-ovatis obtusis, petalis orbiculatis: nervis ramulosis.

Habitat in Germaniâ? ♃. (v. v. c.)

Herba glabra, saturatè virens, densissimè cæspitosa, ad anthesin pilis brevibus glanduliferis adspersa, surculosa. *Surculi* breves, erecti. *Caules* erecti, 2½—3-pollicares, 2—3-flori, nitidi, pilis glanduliferis parcè suppediti. *Folia* radicalia 5-fida, palmata; surculina trifida: segmenta linearia, obtusa, carnosa, marginata, apice mucronulo tenui instructa; *caulina* inferiora digitato- 5-partita; superiora tripartita. *Flores* lactei, magnitudine ferè præcedentis. *Calyces* pedicellique pube glandulosâ instructi: laciniæ latè-ovatæ, obtusæ. *Petala* suborbiculata, triplinervia: nervis ramosiusculis. *Stamina* brevia; *filamenta* virescentia; *antheræ* luteæ.

My friend Mr. Anderson, of the Chelsea Botanic Garden, received this species from Germany under the name of *S. Sternbergii*. It is, however, in several respects very distinct from that species. I do not remember to have seen it any where else but with him, nor have I met with specimens of it either in the Herbariums of London or Paris.

86. *S. tridentata*, glabra; foliis radicalibus 5-fidis; surculinis longè petiolatis acutè tridentatis, laciniis calycinis triangulari-ovatis mucronatis, petalis spathulatis.

Habitat . . . . ♃. (v. v. c.)

Herba

Herba densissimè cæspitosa, ante anthesin glaberrima, posteà surculosa, villis viscidis levitèr sparsa. *Surculi* brevissimi, erecti, conferti, crebrè foliosi. *Caules* erecti, triunciales, graciles, oligophylli, pauciflori, purpurascentes, nitidi, pilis glanduliferis parcè tecti. *Folia* radicalia patentia, 5-fida; surculina erecta, longè petiolata (petiolis gracilibus villis ciliatis), spathulata, plerumque tridentata: dentibus brevibus ovatis mucronulatis; lateralibus minoribus. *Pedicelli* breves, uniflori, calycesque pube brevi viscidâ tecti. *Flores* nivei. *Calycis laciniæ* triangulari-ovatæ, mucronatæ. *Petala* spathulata, triplinervia: nervis simplicibus, strictis. *Stamina* inæqualia; *filamenta* viridia; *antheræ* aureæ.

I met with this plant in Mr. Knight's exotic nursery, King's Road, Chelsea. It is specifically distinct from all the species with which I am acquainted. Its native country, however, I have not been able to ascertain.

87. *S. andicola*, villosissima; foliis radicalibus trifidis: segmentis lanceolatis acutis; surculinis superioribus linearibus simplicibus acutis, laciniis calycinis ovatis acutis, petalis obovato-orbiculatis: nervis ramosis.

S. villosa. *Pavon Mss.*

Habitat in frigidissimis Peruviæ. *Pavon.* ♃. (v. s. in Herb. Pavon. in Mus. Lamb.)

Herba villosissima, densissimè cæspitosa. *Surculi* breves, decumbentes. *Caules* erecti, sesqui- vel bi-pollicares, foliosi, 3—4-flori, villis viscidis confertissimè obsiti. *Folia* radicalia patentia, trifida, brevè-petiolata (petiolis dilatatis subtùs nervosis); surculina inferiora trifida: segmentis lineari-lanceolatis, acutis, subtùs conspicuè trinervibus,

nervibus, superiora indivisa, lineari-lanceolata, acuta, subtùs trinervia; *caulina* ima tripartita, superioribus indivisis. *Flores* lactei, subcorymbosi. *Calyx* densè glanduloso-pilosus: laciniæ ovatæ, mucronulatæ. *Petala* obovato-orbiculata, triplinervia: nervis lateralibus, conniventibus, ramosis; medio recto, subsimplici. *Filamenta* brevia, lutescentia. *Antheræ* flavæ.

Nothing is probably more interesting to botanists than species of those genera, which are chiefly confined to the colder zones, from tropical climates. Among the rich and highly interesting harvest of plants discovered by the celebrated authors of the *Flora Peruviana*, Ruiz and Pavon, are several species of *Saxifraga;* of each of which there are excellent specimens in the Herbarium of Don Jose Pavon, now in the possession of A. B. Lambert, Esq. The present is totally distinct from every other species. I would have most willingly retained the name given to it by its discoverer; but as that name has been already applied to a very different plant, namely, *S. decipiens*, to prevent any ambiguity or confusion I have judged it best to change it.

88. *S. cæspitosa*, foliis radicalibus aggregatis 5—3-fidis indivisisve: segmentis lineari-lanceolatis obtusis, caule oligophyllo paucifloro, laciniis calycinis ovatis obtusis, petalis conniventibus obovato-rotundatis.

S. cæspitosa. *Linn. Sp. Pl.* 578. *Fl. Suec.* ii. *n.* 376. *Fl. Lapp. edit. alter.* 142. *Gunn. Norv. n.* 1047. *t.* 7. *f.* 3. *an etiam f.* 4? *Smith Brit.* ii. *p.* 455. *Engl. Bot. t.* 794. *Prod. Fl. Græc.* i. *p.* 277. *Wahlenb. Lapp.* 119.

S. grœnlandica. *Sp. Pl.* 578. *Gunner. Norv.* 689. *t.* 7. *f.* 1. (*optima.*) *Lapeyr. Pyren. Saxif. p.* 39. *t.* 19. *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 53.

S. foliis

S. foliis petiolatis trifidis, caule subfolioso viscido. *Hall. Helv. n.* 989.

S. tridactylites grœnlandica, cauliculis valdè foliosis. *Dill. Eltham. p.* 337. *t.* 353. *f.* 329.

S. tridactylites alpina minor et villosa. *Tourn. Inst.* 252.

Sedum tridactylites, alpinum minus. *Bauh. Pin.* 284. *Prod.* 131.

Habitat in Lapponiæ, Sueciæ, Helvetiæ, Norvegiæ et Pyrenæorum alpibus; etiam in Grœnlandiâ et rupibus alpinis Cambro-Britanniæ. ♃. (v. v. c. et s. spont.)

Planta densissimè cæspitosa, pilis glanduliferis brevibus confertissimè suppedita. *Surculi* brevissimi, creberrimè foliosi, basi foliis emarcidis densè imbricati. *Caules* erecti, 1—2-unciales aut rariùs ultrà, teretes, oligophylli, 1—3-flori, in cultâ sæpiùs 4-flori. *Folia* radicalia aggregata, imbricata, sæpius 5-fida, nunc 3-fida aut indivisa: segmenta lineari-lanceolata, obtusa, carnosa, obscurè nervosa; *caulina* ima palmata, summis plerumque tripartitis: segmentis linearibus. *Pedicelli* breves, uniflori, calycesque pube brevissimâ viscidâ tecti. *Flores* majusculi, lactei. *Laciniæ calycinæ* ovatæ, obtusæ, carnosæ, obsoletè trinerves. *Petala* obovato-rotundata, conniventia, calyce duplò longiora, triplinervia: nervis simplicibus; medio recto; lateralibus curvatis. *Filamenta* lutea. *Antheræ* flavæ.

Much confusion has existed, and still exists, even in our latest works on *Saxifragæ*, regarding this species, which appears to have arisen chiefly from the improper synonyms Linnæus added to his plant. No doubt, had Linnæus seen the plant those authors which he quoted intended by their imperfect figures and descriptions, he would have been at once convinced of its being widely different

different from the Swedish and Lapland plant. Indeed no two species can be more dissimilar than it and the *S. muscoides* of Wulfen, which La Peyrouse and Sternberg in their excellent works still insist on as being the real *cæspitosa* of Linnæus.

S. cæspitosa varies much in size, and in the number of flowers on each stalk, as well as of its cauline leaves. There are specimens from the Linnæan Herbarium, collected by the late Dr. Solander on the Lapland alps, and preserved in the Banksian Herbarium, which accord exactly with Gunner's figure 3. They are taller and stronger than the general state of *S. cæspitosa;* but in no essential points do they differ. Gunner's figure 4, notwithstanding the greater number of flowers, ought also to be referred to this plant; it certainly does not represent *S. decipiens.* I am inclined to think Willdenow's *cæspitosa* belongs more probably to *S. exarata* than to this.

89. *S. stellata*, foliis creberrimis appressè imbricatis 5-fidis trifidisve: segmentis lineari-oblongis obtusis, caule bifloro, laciniis calycinis ovatis acutis, petalis obovatis.

S. stellata. *Pavon Mss.*

Habitat in frigidissimis Andium Peruviæ. *Pavon.* ♃. (v. s. in Herb. Pavon. nunc in Mus. Lamb.)

Herba densè cæspitosa, *Fragosæ corymbosæ* (Fl. Per.) habitu admodum similis, pube glandulosâ tecta. *Surculi* erecti, conferti, foliis undique crebrè imbricati. *Caules* erecti, vix unciales, graciles, biflori. *Folia* creberrima, appressè imbricata, omnia 5-fida vel trifida: segmenta lineari-oblonga, obtusa, carnosa, subtùs uninervia; caulina simplicia, linearia, obtusa. *Petioli* breves, latissimè dilatati. *Flores* lactei, majusculi. *Calyces* pube glandulosâ brevi densè tecti: laciniæ ovatæ, acutæ. *Petala* obovata, triplinervia: nervis simplicibus strictis.

OBS.

Obs. A *S. cæspitosâ* longè discrepat: habitu, foliis creberrimis appressè imbricatis, petiolis latissimè dilatatis, laciniis calycinis acutis et petalis obovatis.

91. *S. Bonplandii*, pubescens; foliis congestis 5-fidis trifidisve: segmentis linearibus obtusis, laciniis calycinis lanceolatis acutis, petalis obovatis.

S. peruviana. *Bonpland in Sternb. Saxif. p. 55. t. 22.*

S. alpina. *Pavon Mss.*

Habitat in Andium Peruvianorum summis Cordilleras dictis. *Pavon, Bonpland.* ♃. (v.s. in Herb. Pavon. nunc in Mus. Lamb.)

Herba densissimè cæspitosa, pilis brevissimis glanduliferis confertissimè obtecta. *Surculi* breves, adscendentes, crebrè foliosi. *Caules* numerosissimi, unciales, erecti, oligophylli, glanduloso-tomentosi. *Folia* radicalia et surculina congesta, imbricata, quinque- vel tri-partita: segmenta linearia, obtusa, carnosa, enervia; caulina inferiora tripartita: summis simplicibus lineari-lanceolatis. *Petioli* brevissimi, lineares. *Flores* albi, terminales, terni, capitati, subsessiles, rariùs solitarii. *Calyces* obconici, tomento glanduloso densè tecti: laciniæ lanceolatæ, acutæ, rectæ. *Petala* obovata, triplinervia: limbo orbiculato, patente: nervis simplicibus; lateralibus incurvis. *Stamina* stylis longiora; *filamenta* alba; *antheræ* flavæ.

This is the only species of *Saxifraga* discovered by the illustrious travellers Humboldt and Bonpland in South America. While in Paris, my esteemed friend M. Kunth, the celebrated editor of the *Nova Genera et Species Plantarum*, had the kindness to permit me to examine the specimens of this plant in the Humboldtian Herbarium. These specimens appeared more diffuse and stronger than those of *S. alpina* (Pavon) in the Lambertian

bertian Herbarium; but in every essential point they seemed to coincide.

91. *S. magellanica*, caulibus cæspitosis procumbentibus, foliis linearibus trifidisve confertissimis glabris, ramis floriferis nudis axillaribus brevissimis unifloris. *Lam. Encycl.* vi. *p.* 686.

S. *magellanica*, foliis congestis viscoso-pubescentibus; inferioribus trifidis; superioribus simplicibus, floribus subbinatis subsessilibus. *Persoon Synop.* i. *p.* 491. *Sternb. Saxif. p.* 39. *t.* 11. *a.*

Habitat ad Fretum Magellanicum. *Commerson.*

Planta cæspitosa. *Caules* breves, procumbentes, foliosi. *Folia* inferiora trifida; superiora indivisa, linearia, obtusa, glabriuscula. *Flores* solitarii, brevissimè pedunculati. *Pedunculi* nudi. *Calyx* glaber: laciniis linearibus, obtusis. *Petala* obovata, calyce duplò longiora. *Lam. loc. cit.* (ex Gall. vers.)

I am sorry that while at Paris I neglected to examine the specimens of this in Commerson's Herbarium; I have therefore followed Lamarck, as being the first who described it, in preference to Persoon and Sternberg, whose descriptions, and also the figure of the latter, disagree with Lamarck's description in some important points.

92. *S. exarata*, pubescens; foliis radicalibus quinque- tri-partitisve; surculinis tripartitis: segmentis linearibus obtusissimis suprà exaratis, caule multifloro, laciniis calycinis ovato-oblongis obtusis, petalis obovatis: nervis simplicibus.

S. exarata. *Villars. Delph.* iv. *p.* 674. *t.* 45. *Lam. et Decand. Fl. Franc.* iv. *p.* 374.

S. ner-

S. nervosa. *Lapeyr. Pyren. Saxif. p.* 63. *t.* 39. *Lam. Encycl.* vi. *p.* 696. *Persoon Synop.* i. *p.* 490. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 316. *Sternb. Saxif. p.* 52.

S. hypnoides. *Allion. Ped.* 1538. *t.* 21. *f.* 4. (excl. synon.)

β. *pubescens*, foliis radicalibus surculinisque profundè tripartitis: segmentis lateralibus bifidis, floribus longè pedunculatis subcorymbosis.

S. pubescens. *Poir. Act. Toul.* iii. *p.* 327. *Lam. et Decand. Fl. Franc.* iv. *p.* 375. *Sternb. Saxif. p.* 53.

S. mixta α et β. *Lapeyr. Pyren. Saxif. p.* 41. *t.* 21. *Persoon Synop.* i. *p.* 490.

S. cæspitosa. *Villars. Delph.* iv. *p.* 672. (excl. syn.) *Wulfen in Jacq. Collect.* i. *p.* 290? *Willd. Sp. Pl.* ii. *p.* 656?

γ. *intricata*, foliis radicalibus confertis patentibus cuneatis 5-fidis, pedunculis divaricatis.

S. intricata. *Lapeyr. Saxif. Pyren. p.* 58. *t.* 33. *Lam. et Decand. Fl. Franc.* iv. *p.* 374. *Persoon Synop.* i. *p.* 490.

Habitat α in summis alpibus Pyrenæorum (*La Peyrouse*), Delphinatus (*Villars*), Sabaudiæ et Pedemontis (*Allioni*), Caucasi (*Marschall à Bieberstein*); β et γ in Pyrenæis (*La Peyrouse*), β etiam in Terrâ Novâ (*Herb. Banks.*) ♃. (v. v. c. α, et s. spont. β et γ.)

Planta ante anthesin densissimè cæspitosa, posteà surculosa, pilis brevissimis glanduliferis densè pubescens. *Surculi* erecti, bi- vel tri-unciales, rigidiusculi. *Caules* erecti, 3—4- rariùs 5-pollicares, multiflori, pube brevi viscidissimâ confertè suppediti. *Folia* radicalia 5—3-partita, deflexo-patentia, rosulata; surculina erecta, tripartita, rarissimè indivisa: segmenta linearia, obtusissima, suprà nervis lineatis exarata; *caulina* profundè tripartita: segmentis lateralibus sæpè bifidis. *Petioli* lineares plani,

conspicuè

conspicuè trinerves. *Pedunculi* filiformes, uniflori, folio profundè tripartito bracteam mentiente ad basin cujusque instructi, laterales subæquales; terminali breviore. *Flores* candidi. *Calyces* obconici, pube brevi densâ instructi: laciniæ ovato-oblongæ, obtusæ, carnosæ, obsoletè trinerves. *Petala* obovata, calyce duplò longiora, triplinervia, apice retusa: nervis simplicibus, strictis. *Stamina* subæqualia; *filamenta* lutea; *antheræ* aureæ.

I have reduced to this plant the *Saxifraga intricata* and *mixta* of La Peyrouse, and the *pubescens* of Poiret, as neither of them affords sufficient or permanent characters to establish them as distinct species. It varies much in size and in the number of the segments of its leaves; and likewise in the number of flowers on a stalk; but its prominent features are always the same.

93. *S. Pavonii*, pubescens; foliis tripartitis: segmentis linearibus acutis nervosis, petiolis linearibus dilatatis subtùs costatis, laciniis calycinis lineari-lanceolatis acutis, petalis obovatis.

Habitat in Andium Peruvianorum locis frigidissimis. *Pavon.* ♃. (v. s. in Herb. Pavon. nunc in Mus. Lamb.)

Herba pubescens, in cæspitibus densis, planis vegetans. *Surculi* brevissimi, basi foliis emarcidis crebrè instructi. *Caules* erecti, 4—5-unciales, oligophylli, 3—5-flori, pilis brevissimis glanduliferis tecti. *Folia* omnia tripartita, subtùs insignitèr costata; inferiora deflexo-patentia; superiora erecta: segmenta linearia, acuta; lateralibus rarissimè unidentatis; *caulina* inferiora tripartita; superiora simplicia, lineari-lanceolata, acuta. *Petioli* dilatati, lineares. *Pedunculi* elongati, uniflori calycesque pube brevissimâ glandulosâ densè tecti. *Flores* lactei, ad sic-

cationem

cationem lutescentes. *Calycis laciniæ* lineari-lanceolatæ, acutæ. *Petala* obovata, triplinervia: nervis rectiusculis, simplicibus.

OBS. A præcedente distinctissima: segmentis foliorum acutis, laciniis calycinis lineari-lanceolatis acutis et aliis characteribus.

94. *S. pedemontana*, pubescens; foliis aggregatis cuneato-spathulatis digitato-sectis exaratis: segmentis lineari-oblongis integris tridentatisve, floribus corymbosis, laciniis calycinis lineari-elongatis acutis, petalis oblongo-spathulatis.

S. pedemontana. *Allion. Ped. n.* 1540. *t.* 21. *f.* 6. (*optima.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 372. *Persoon Synop.* i. *p.* 490.

S. cymosa. *Waldst. et Kit. Pl. Rar. Hung. p.* 91. *t.* 88.

S. heterophylla. *Sternb. Saxif. p.* 50. *t.* 20. *f.* 1. *et* 2.

Habitat in alpibus Pedemontanis (*Allioni, Bellardi, et Balbis*), Marmaroszensibus (*Waldstein et Kitaibel*). ♃. (v. s. in Herb. Ventenat. nunc in Mus. Lessertiano).

Planta densè cæspitosa. *Radix* fusca, foliorum emarcidorum rudimentis densissimè tecta. *Surculi* brevissimi, densè foliosi. *Caules* erecti, teretes, 4—5-pollicares, multiflori, pube brevissimâ glutinosâ undique tecti. *Folia* aggregata, cuneato-spathulata, levitèr pubescentia, digitatìm secta, suprà exarata, subtùs costata; adultiora deflexo-patentia; juniora erecta: segmentis lineari-oblongis, acutis, integerrimis tridentatisve; *caulina* inferiora cuneata, digitato-secta; suprema tripartita: segmentis linearibus acutis. *Flores* magni, campanulati, candidi, corymbosi. *Calyces* profundè 5-partiti pedicellique pube brevi viscidâ densè tecti: laciniæ lineares, elongatæ,

elongatæ, acutæ, rectæ. *Petala* oblongo-spathulata, triplinervia: nervis rectis, simplicibus. *Genitalia* petalis breviora; *filamenta* capillaria, lutescentia; *antheræ* aureæ. *Styli* erecti, staminibus breviores.

I had an opportunity, while in Paris in August 1821, of examining several very fine specimens of this truly distinct species in the Herbarium of the late M. Ventenat, now in the possession of Baron Benjamin De Lessert. I take this opportunity, therefore, of acknowledging my thanks to M. De Lessert for his kindness in permitting me to examine his extensive and valuable collection. These specimens were collected on the Pedemontese alps by Drs. Bellardi and Balbis, who communicated them to M. Ventenat. The Count de Sternberg is of opinion, that the *cæspitosa* of Wulfen is the same as this species; but I am rather inclined to think (judging from the description) that Wulfen's plant belongs to *S. exarata.*

95. *S. moschata*, pubescens; foliis radicalibus trifidis; surculinis trifidis indivisisve nervosis: segmentis linearibus acutiusculis, caule filiformi subracemoso, petalis angustè-ovalibus calycem vix superantibus.

S. moschata. *Wulfen in Jacq. Misc.* ii. *p.* 128. *t.* 21. *f.* 2. (*bona.*) *Murr. Syst. Veg.* xiv. *p.* 414. *Willd. Sp. Pl.* ii. *p.* 656. *Lapeyr. Pyren. Saxif. p.* 61. *t.* 37. (*media.*) *Lam. Encycl.* vi. *p.* 695. *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 41. *t.* 11. *f.* 3.

S. cæspitosa. *Scop. Carn.* 494. *t.* 14.

S. exarata. *Allion. Ped.* 1539. *f.* 2. (*mala.*)

S. muscoides. *Sternb. Saxif. p.* 39. *t.* 11. *f.* 2. (omiss. var. β et γ, et exclus. synon. *Smith Brit.*)

Sedulum quod moschatellina alpina lutea vocari potest. *Gesn. fasc.* xxv. *t.* 6. *f.* 31.

Tridactylites

Tridactylites alpina. *Bauh. Hist.* iii. *p.* 754. (*fig. benè.*)
Habitat in alpibus Carinthiacis, Carniolicis, Sabaudicis, Salisburgensibus, inque Pyrenæis. ♃. (v. v. c.)

Planta ante anthesin densè cæspitosa, læviuscula, postmodùm surculosa, glandulis brevissimis densè pubescens. *Surculi* erecti, elongati, graciles. *Caules* erecti, filiformes, graciles, 2—3-unciales, nudiusculi, 3—5-flori. *Folia* radicalia trifida, patentia, longè-petiolata ; surculina plerumque trifida rariùs indivisa, erecta, etiam longè petiolata, omnia suprà lineis exarata : segmenta linearia, acutiuscula. *Petioli* angustè lineares, tenues, submembranacei, suprà lineâ exarati. *Flores* racemosi, brevè pedicellati, ad basin cujusque pedicelli folio tripartito bracteam mentiente instructi. *Calyces* obconici, densè glandulosi pubescentes : laciniæ lineares, obtusæ. *Petala* angustè ovalia, acutiuscula, lutea, triplinervia, calyce parùm longiora : nervis simplicibus, strictis. *Filamenta* brevissima, virescentia. *Antheræ* luteæ.

The Count de Sternberg's *t.* 11. *f.* 3. is a very good representation of this plant, and not inferior to Jacquin's ; but he has inadvertently confounded it with the two following, from which it is very distinct. His variety γ I have no doubt belongs to *S. pygmæa.*

96. *S. muscoides,* glaberrima ; foliis radicalibus integris trifidisve ; surculinis omnibus linearibus indivisis obtusis enervibus, caule gracillimo subtrifloro, petalis linearibus calyce parùm longioribus.

S. muscoides. *Wulfen in Jacq. Misc.* ii. *p.* 125. *Willd. Sp. Pl.* ii. *p.* 656. (exclus. synon. *Scop. Carn.*) *Lam. Encycl.* vi. *p.* 697. *Persoon Synop.* i. *p.* 491. *Lam. et Decand.*

cand. Fl. Franc. iv. *p.* 376. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 316. *Sternb. Saxif. p.* 39.

S. cæspitosa. *Huds. Angl. p.* 181. (exclus. synon. *Linn. et Fl. Dan.*) *Lapeyr. Pyren. Saxif. p.* 59. *t.* 35. *an item t.* 34? *Sternb. Saxif. t.* 11. *f.* 1 (*media.*)

S. moschata. *With. Brit.* ii. *p.* 406.

S. pyrenaica. *Vill. Delph.* iii. *p.* 671.

S. pyrenaica, foliis partim integris partim trifidis. *Tournef. Inst.* 253. *Segu. Veron.* iii. *p.* 205. *et* i. *p.* 451. *t.* 9. *f.* 4. (*benè.*) *Hall. Opusc.* 292. *t.* 1.

S. foliis integris et trifidis, caule subnudo paucifloro. *Hall. Helv.* 988.

Habitat in alpibus Carinthiacis (*Wulfen*), Helveticis (*Haller*), Tridentinis (*Seguier*), Delphinatis (*Villars*), Gilanensibus Persiæ (*Herb. Pallas*), Caucasicis (*Marschall à Bieberstein*), Pyrenæorum (*La Peyrouse*), in montibus supra Ambleside in Westmorlandiâ (*Hudson*). ♃. (v. v. c.)

Planta virens glaberrima, densissimè cæspitosa. *Surculi* erecti, longiusculi, graciles. *Caules* erecti, biunciales, nudiusculi, filiformes, gracillimi, plerumque triflori, levitèr glandulosi. *Folia* radicalia, integra vel trifida : lobis brevibus obtusis ; surculina omnia linearia, indivisa, obtusa, enervia, marginata, utrinque glaberrima nitida, rariùs ad margines glandulis brevissimis parcissimè instructa. *Pedicelli* breves, graciles ; laterales medio longiores calycesque glandulis brevissimis suppediti. *Laciniæ calycinæ* lanceolatæ, obtusissimæ, trinerves. *Petala* linearia, pallidè lutescentia, obtusa, emarginata, trinervia, calyce parùm longiora : nervis parallelis, simplicibus. *Genitalia* brevissima ; *filamenta* pallida ; *antheræ* fuscæ.

The above species, notwithstanding its being probably the most

most distinct of the whole section, has given rise to much confusion. It has been regarded by most authors as the real *cæspitosa* of Linnæus, as I have already shown in speaking of that plant. I am glad in being able to fix it as a British species, and also to restore to it the synonyms of Hudson and Withering, which I have done without hesitation from specimens collected at Ambleside in Westmoreland, and which had been sent to my late father, and preserved in his Herbarium.

97. *S. pygmæa*, glaberrima; surculis brevissimis rosulatis, foliis lanceolatis enervibus glabris apice obscindente-obtusis, laciniis calycinis latè ovatis, petalis ovalibus vix calyce longioribus.

S. pygmæa. *Haworth Misc. Nat. p.* 168.

S. muscoides γ hemisphærica. *Lapeyr. Pyren. Saxif. p.* 60. *t.* 36. (*optima.*) *Persoon Synop.* i. *p.* 491.

S. moschata. *Engl. Bot. t.* 2214. (exclus. synon.)

S. moschata, β. *Lapeyr. l. c. p.* 62. *t.* 38.

S. moschata γ. *Sternb. Saxif. t.* 11. *β. f.* 2.

Habitat in Pyrenæis, *La Peyrouse.*

Planta glaberrima, densissimè cæspitosa, patula, humi depressa. *Surculi* brevissimi, rosulati, crebrè foliosi. *Caules* filiformes, graciles, paucifolii, 3—4-flori, glandulis brevissimis suppediti. *Folia* lanceolata, patentia, rosulata, carnosa, enervia, marginata, glabra, nitida, apice obscindente-obtusa. *Flores* hujus sectionis omnium minimi fulvo-lutescentes. *Calyces* pedicellique glandulosi: laciniæ breves, latè-ovatæ, obtusissimæ, trinerves. *Petala* ovalia, integra, vix calyce longiora, viridi-lutescentia, punctis nitidis suprà adspersa, trinervia: nervis simplicibus, fusco-rubris. *Filamenta* brevissima, purpurea. *Antheræ* minutæ, fulvæ.

 Obs.

Obs. Præcedenti valdè affinis, sed satìs differt: humiliore et densiore, surculis vix ullis, foliis lanceolatis brevioribus crassioribusque apice obscindente-obtusis, laciniis calycinis brevibus latè-ovatis, petalis ovalibus integris: nervis fusco-rubris, filamentis purpureis, antheris fulvis.

Mr. Haworth first distinguished this species in his *Miscellanea Naturalia*, and gave it the very apt name which it now bears. This plant is given in *English Botany* as a British species, and, on the authority of the late Mr. James Donn of Cambridge, is said to be a native of Scotland: but some other plant must have been intended; for I doubt much whether the present has been ever found any where in Britain. In Scotland I am certain it has not.

98. *S. tricuspidata*, foliis radicalibus aggregatis cuneiformibus ciliatis acutè tridentatis, caule adscendente racemoso, petalis lanceolatis calyce triplò longioribus. *Willd. Sp. Pl.* ii. *p.* 657.

S. tricuspidata. *Rottb. Act. Hafn.* x. *p.* 446. *t.* 6. *Gunn. Norveg.* 1046. *Fl. Dan. t.* 976. (*bona.*) *Retz. Prod. Fl. Scand. ed.* ii. *n.* 522. *Lam. Encycl.* vi. *p.* 693. *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 54. *Pursh Amer. Sept.* i. *p.* 313.

Habitat in Grœnlandiâ et Terrâ Novâ. ♃. (v. s. in Herb. Banks.)

Planta densissimè cæspitosa, glabra. *Surculi* brevissimi. *Caules* laterales, adscendentes, teretes, 4—5-unciales, oligophylli, glabriusculi, multiflori. *Folia* radicalia aggregata, oblongo-cuneata, apice acutè tridentata: dente medio majore triangulari; lateralibus mucronatis: paginâ utrinque glabrâ: margine ciliato; *caulina* inferiora tridentata; superiora indivisa. *Pedicelli* elongati, uniflori, calycesque levitèr glandulosi. *Flores* lutei, magnitudine

S. Hir-

S. Hirculi. Laciniæ calycinæ breves, ovatæ, obtusæ. *Petala* lanceolata, calyce triplò longiora, punctata, triplinervia: nervis parallelis, simplicibus. *Filamenta* lutescentia, stylis longiora. *Antheræ* croceæ.

99. *S. tridactylites*, foliis primordialibus integris spathulatis; caulinis quinquefidis trifidisve, calycibus urniformibus: laciniis brevissimis, petalis obovatis apice truncatis.

S. tridactylites. *Linn. Sp. Pl.* 578. *Fl. Suec.* 353. 375. *Gerard. Fl. Gall.* 422. *Gouan Monsp.* 210. *Gunn. Norv.* 544. *Scop. Carn.* 550. *Pollich. Pal.* 403. *Huds. Angl.* 182. *Lightf. Scot.* 224. *Curtis Lond. fasc.* ii. *t.* 28. *Vill. Delph.* IV. *p.* 669. *Roth Germ.* i. 184. ii. 469. *With. Brit.* 406. *Hoffm. Germ.* 145. *Willd. Sp. Pl.* ii. *p.* 654. *Lam. Encycl.* vi. *p.* 693. *Smith Brit.* ii. *p.* 455. *Engl. Bot. t.* 501. (*media.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 369. *Persoon Synop.* i. *p.* 490. *Marsch. à Bieberst. Fl. Taur. Cauc.* i. *p.* 315. *Sternb. Saxif. p.* 44. *t.* 17. *Wahlenb. Lapp.* 218. *ejusd. Carpath.* 121.

S. annua. *Lapeyr. Pyren. Saxif. p.* 53.

S. foliis omnibus trilobis basi angustis, caule erecto. *Linn. Fl. Lapp.* 173. *Hort. Cliff.* 168.

S. foliis petiolatis trilobatis, caule erecto ramoso et folioso. *Hall. Helv.* 986.

S. foliis trifidis basi angustis, caule erecto. *Roy. Lugd. Batav.* 457. *Sauv. Monsp.* 208.

Sedum tridactylites tectorum. *Bauh. Pin.* 285. *Moris. Hist.* iii. *p.* 478. *s.* 12. *t.* 9. *f.* 31. (*bona.*)

Paronychia altera. *Dod. Pempt.* 113. *Tabern.* 805.

Paronychia rutaceo folio. *Blackw. t.* 212.

β. alpicola, major; foliis radicalibus congestis; caulinis numerosioribus plerumque 5-dentatis, floribus duplò majoribus.

S. tridac-

S. tridactylites, β. *Linn. Sp. Pl. ed.* i. *p.* 404. *Fl. Suec.* 353. 375. *Fl. Lapp.* 173. (exclus. synon. *Ponæ.*)

S. adscendens. *Sp. Pl. ed. altera* 579. *Mant. p.* 884. *Allion. Ped.* 1537. *t.* 22. *f.* 3. *Wulfen apud Jacq. Coll.* i. *p.* 197. *t.* 11. 12. *f.* 1. 2. *Persoon Synop.* i. *p.* 490.

S. petræa. *Gunn. Norv.* 427. *t.* 9. *f.* 1. 3. (exclus. synon. et descrip. *Linn.*) *Fl. Dan. t.* 680. *Vahl. in Act. Hist. Nat. Hafn.* 2. 1. *p.* 10. *Willd. Sp. Pl.* ii. *p.* 654. (exclus. synon. *Linn.*) *Lam. Encycl.* vi. *p.* 694. (exclus. synon. *Linn.*) *Lam. et Decand. Fl. Franc.* iv. *p.* 370. *Wahlenb. Lapp.* 219. (exclus. synon. *Linn.*) *ejusd. Carpath.* 122. (exclus. synon. *Linn.*)

S. hypnoides. *Scop. Carn.* 499. *t.* 16.

S. Scopolii. *Vill. Delph.* IV. *p.* 670.

S. controversa. *Sternb. Saxif. p.* 43. *t.* 16. *fig. omnes.*

Sedum tridactylites alpinum, caule folioso. *Bauh. Pin.* 284.

Habitat α in Europæ arenosis copiosè; β in Lapponiæ, Norvigiæ, Sabaudiæ, Carinthiæ, Carpathorum alpibus. ⊙. (v. v. spont. α, β v. s.)

Radix fibrosa, annua. *Caules* erecti, ramosi, teretes, flexuosi, multiflori, pilis brevibus glanduliferis instructi. *Folia* radicalia conferta, spathulata, patentia, indivisa, petiolata; caulina cuneiformia, carnosa, quinquefida aut trifida vel rariùs tridentata: basi angustata petiolique glandulis ciliata, lobis obtusiusculis. *Pedunculi* recti, filiformes, subuniflori, calycesque pube viscidâ brevi tecti. *Flores* parvi, candidi. *Calyces* urniformes: laciniæ brevissimæ, obtusæ, obscurè trinerves. *Petala* obovata, trinervia, apice truncato-obtusa, calyce paulò majora: nervis simplicibus, rectis. *Filamenta* alba, brevissima. *Antheræ* luteæ. *Styli* recurvati.

100. *S. pe-*

100. *S. petræa*, foliis radicalibus 5-lobo-palmatis; caulinis tripartitis incisisque, pedunculis longissimis unifloris, laciniis calycinis linearibus acutis, petalis obovatis apice truncatis emarginatisque calyce duplò majoribus.

S. petræa. *Linn. Sp. Pl.* 578. (exclus. plerisq. synon.) *Wulfen in Jacq. Coll.* i. *p.* 200. *Jacq. Icon. Rar.* i. *t.* 81. (*bona.*) *Hoffm. Germ.* 145?

S. geranioides. *Host. Synop.* 231.

S. rupestris. *Willd. Sp. Pl.* ii. *p.* 653.

S. Ponæ. *Sternb. Saxif. p.* 47. *t.* 18. (*mala.*) *et t.* 11. *f.* 6.

S. alba petræa. *Pona Bald. apud Clus. Hist.* ii. *p.* 337. *cum figurâ bonâ. Pona It. p.* 183. *Segu. Veron.* i. *p.* 447.

S. bianca. *Calceol. It.* 12.

Sedum tridactylites majus album. *Bauh. Pin.* 284. *Prod.* 31. *Raii Hist.* XIX. *p.* 1043. *Moris. Hist.* iii. *p.* 379. *s.* 12. *t.* 9. *f.* 28. (*benè.*)

Sanicula aizoides alpina trifido folio major alba. *Pluken. Alm.* 331. *t.* 222. *f.* 3.

Habitat in præruptis saxosis Montis Baldis (*Pona, Seguier, Sternberg*), in Carinthiæ alpibus (*Wulfen*). ⊙. (v. s. in Herb. Banks.)

Planta diffusè ramosa, pilis patentibus glanduliferis instructa. *Radix* fibrosa, annua. *Caules* erecti, basi ramosi, 4—5-unciales. *Rami* elongati, subfastigiati. *Folia* radicalia longè petiolata, 5-lobo-palmata, basi subreniformia: lobis latè ovatis, obtusis; *caulina* omnia petiolata, ima tripartita; summa indivisa, elliptica, utrinque acuta, multinervosa: segmentis inferiorum cuneatis; lateralibus bifidis medio plerumque trifido: lobis acutis. *Pedunculi* longissimi, uniflori, calycesque pube viscidâ tecti. *Flores* candidi, illis *S. tridactylitis* quadruplò.

majores.

majores. *Calyx* urceolatus: laciniæ lineares, acutæ, trinerves. *Petala* obovata, calyce duplò majora, triplinervia, apice truncata et emarginata: nervis simplicibus.

The above description was taken from a specimen collected on Mount Baldo, and preserved in the Banksian Herbarium. Notwithstanding the very accurate figure which Pona has given of this plant, authors have been much disagreed regarding it. It is undoubtedly the plant Linnæus intended by his *S. petræa*, although his synonyms are very incorrect. The learned Gunner justly remarks, in speaking of his *petræa* (*tridactylites β*), that it ill accorded with the description in the *Species Plantarum*, which has evidently been taken from figures or specimens of the present species, although Linnæus regarded them as the same.

101. *S. adscendens*, foliis profundè tripartitis: segmentis cuneatis multifidis, pedunculis multifloris, petalis ovalibus integris, caule adscendente paniculato.

S. adscendens. *Vahl. in Act. Hist. Nat. Hafn.* 2. 1. *p.* 12. *Willd. Sp. Pl.* ii. *p.* 655. (exclus. omnib. synon. præter *Vahlii et Gouanii.*) *Lam. Encycl.* vi. *p.* 695. (exclus. plerisq. synon.) *Lam. et Decand. Fl. Franc.* iv. *p.* 370. (exclus. syn. *Linn.*)

S. petræa. *Gouan Illust.* 29. *t.* 17. *f.* 3. (*bona.*)

S. aquatica. *Lapeyr. Pyren. Saxif. p.* 53. *t.* 28. (*optima.*) *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 48. *t.* 19. *f.* 1. *et* 2. (*bonæ.*)

β. caule virgato, foliorum lobis acutis subpinnatis, petalis lutescentibus. *Lapeyr. loc. cit. t.* 29.

Habitat α et β in scaturiginosis Pyrenæorum. ♃. (v.s. α in Herb. Vent. nunc in Mus. Lessertiano, et item in Herb. Banks.)

Radix

Radix fibrosa, perennis, cæspitosa. *Surculi* plures, breves, foliosi. *Caules* adscendentes, pedales aut ultra, foliosi, crassitie pennæ anserinæ, succulenti, pilis glanduliferis patentibus confertè suppediti. *Folia* radicalia petiolata, 5-lobo-palmata, carnosa, utrinque glabra: segmentis latè cuneatis, inciso-dentatis; *caulina* omnia petiolata, profundè tripartita: segmenta in lobis lanceolatis obtusiusculis multisecta. *Petioli* breves, ad bases præsertìm radicalium latissimè dilatati. *Flores* coarctato-paniculati, albi, rariùs lutescentes. *Pedunculi* multiflori calycesque pube glandulosâ tecti. *Calyx* obconicus: laciniæ ovato-oblongæ, obtusiusculæ. *Petala* ovalia, integra, triplinervia: nervis simplicibus, rubescentibus. *Stamina* inæqualia stylis longiora; *filamenta* lutescentia; *antheræ* aureæ.

This, which is a very distinct species, is the largest of the whole section, often exceeding a foot in height. I have retained Vahl and Willdenow's name in preference to that of La Peyrouse, on account of its priority.

102. *S. cuneata*, glabra; foliis inferioribus longè-petiolatis cuneatis 5-lobatis; superioribus subsessilibus lanceolatis indivisis, caule adscendente paniculato, petalis oblongis.

S. cuneata. *Willd. Sp. Pl.* ii. *p.* 658. *Lam. Encycl.* vi. *p.* 700. *Persoon Synop.* i. *p.* 489.

S. cuneifolia. *Cavan. Icon.* iii. *p.* 25. *t.* 248.

Habitat in Hispaniæ montibus frigidis juxta Castellfort. *Cavanilles.* ♃.

Radix fibrosa, perennis. *Caules* plures, adscendentes, glabri. *Folia* inferiora longè petiolata (petiolis filiformibus), cuneata, utrinque glabra, basi integerrima, apice 5-loba (lobis ovatis, acutis): superiora indivisa, sessilia, lance-

 olata,

olata, acuta. *Flores* paniculati. *Pedunculi* elongati, filiformes, stricti, uniflori, calycesque læviusculi. *Laciniæ calycinæ* ovatæ, acutæ. *Petala* oblonga, obtusa, candida. *Stamina* corollâ breviora. *Cavan. loc. cit.*

Obs. Exempla hujus speciei nunquam à me visa; attamen ex descriptione et figurâ Clariss. Cavanillesii speciem ab omnibus esse satis diversam licet judicare. An rectè in hac sectione aut meliùs in quartâ sit collocanda?

103. *S. globulifera*, gemmifera; surculis brevibus, foliis surculinis 5-fidis trifidisve nunc simplicibus lanceolatis acutis aristatisque, floribus paniculatis, laciniis calycinis ovali-oblongis obtusis, petalis obovatis.

S. globulifera. *Desf. Atlant.* ii. *p.* 342. *t.* 96. *f.* 1. *Lam. Encycl.* vi. *p.* 699. *Persoon Synop.* i. *p.* 490. *Sternb. Saxif. p.* 45.

Habitat in cacumine Atlantis. *Desfontaines.* ♃. (v. s. in Herb. Lessertiano, specim. à Clar. Desfontainio communicata.)

Planta cæspitosa. *Radix* fibrosa. *Surculi* 1—2-unciales, foliosi, basi rudimentis foliorum emarcidorum instructi. *Caules* erecti, filiformes, tripollicares, foliis paucis minutis muniti, glabri. *Folia* radicalia et surculina, petiolata, 5-fida vel trifida (segmentis lanceolatis), nunc simplicia lanceolata, acuta, setâ diaphanâ terminata, triplinervia: nervis divisis. *Petioli* ciliati. *Axillæ* foliorum gemmis subrotundis, pedunculatis, è foliis (simplicibus) ciliatis appressè imbricatis, posteriorum surculorum formatis instructæ. *Flores* candidi, *S. hypnoide* duplò minores, 5—7 in paniculam dispositi. *Pedicelli* tenues calycesque pube glutinosâ levitèr suppediti. *Laciniæ calycinæ* ovali-oblongæ, obtusæ. *Petala* obovata,

calyce

calyce duplò longiora, triplinervia: nervis simplicibus rectis.

Obs. *S. hypnoidi* affinis, sed satìs distincta.

104. *S. hypnoides*, gemmifera; surculis longissimis procumbentibus, foliis radicalibus quinque- tri-partitisve; surculinis simplicibus linearibus rigidis ciliatis mucronato-aristatis, laciniis calycinis triangulari-ovatis aristatis, petalis subrotundo-obovatis.

S. hypnoides. *Sp. Pl.* 579. *Fl. Dan. t.* 348. *Mill. Dict.* 12. *Huds. Angl.* 182. *Lightf. Scot.* 224. *With. Brit.* 407. *Villars Delph.* iv. *p.* 674. *t.* 45. *Willd. Sp. Pl.* ii. *p.* 658. *Lapeyr. Pyren. Saxif. p.* 57. *t.* 32. *Smith Brit.* ii. *p.* 457. *Engl. Bot. t.* 454. (*mala.*) *Lam. Encycl.* vi. *p.* 698. *Persoon Synop.* i. *p.* 490. *Lam. et Decand. Fl. Franc.* iv. *p.* 376. *Sternb. Saxif. p.* 45.

S. procumbens; foliis linearibus integris trifidisque. *Hort. Cliff.* 168. *Roy. Lugdb.* 453. *Sauv. Monsp.* 208. *Gort. Gelr.* 248.

Sedum alpinum, trifido folio. *Bauh. Pin.* 284. *Moris. Hist.* iii. *p.* 479. *s.* 12. *t.* 9. *f.* 26. (*benè*).

Sedum muscosum, trifido folio. *Raii Syn.* 354.

Sedum alpinum 7. *Clus. Pann. p.* 491.

β. *viscosa*, mollior et laxior; floribus majoribus.

S. viscosa. *Hortorum.*

γ. *angustifolia*, surculis adscendentibus, foliis longioribus.

S. angustifolia. *Hortulanorum.*

δ. *muscosa*, duplò minor et tenerior; segmentis foliorum minimis, floribus minoribus.

ε. *pulchella*, robustior; surculis crassioribus rigidioribusque, gemmis obtusis confertioribus, foliis surculinis latioribus suprà sulco exaratis, petalis latioribus.

Habitat α in alpibus Helveticis, Austriacis, Pyrenaicis, Cambro-Britannicis, Angliæ borealis; in Scotiæ montibus passìm; β, γ, δ, ε in alpibus Scoticis. ♃. (v. v. spont.)

Herba ante anthesin densissimè cæspitosa, glaberrima, posteà laxa, surculosa, villis mollibus adspersa. *Surculi* procumbentes, longissimi, rigidiusculi, rubescentes. *Caules* erecti, 3—4-unciales, rubescentes, nitidi, fragiles, 2—4-flori. *Folia* radicalia quinque- vel tripartita rariùs indivisa, glabra, margine villis parcis ciliata: segmentis linearibus, aristatis; surculina omnia indivisa, linearia, acutissima, aristâ longâ terminatâ, ad axillas gemmis ovatis, acutis instructa; *caulina* pauca, lineari-lanceolata, indivisa. *Pedunculi* elongati, subuniflori calycesque pube brevissimâ viscidâ densè suppediti. *Laciniæ calycinæ* triangulari-ovatæ, trinerves, mucronato-aristatæ: mucrone recto. *Petala* subrotundo-obovata, plana, conspicuè triplinervia, candida, apice extùs rosea: nervis simplicibus, rectis.

105. *S. condensata*, surculis procumbentibus abbreviatis, foliis radicalibus 5-partitis; surculinis trifidis: segmentis linearibus glabris aristatis, laciniis calycinis triangulari-ovatis acutis muticis, petalis ovalibus.

S. condensata. *Gmel. Fl. Baden.* ii. *p.* 226. *t.* 3.

S. densa et lævis. *Hortulanorum.*

Habitat in Sponhemiæ rupibus (*Gmelin*), in alpibus Scoticis (*G. Don*). ♃. (v. v. spont.)

Herba glaberrima, nitida, jucundè viridis, ante anthesin densissimè cæspitosa, postmodò surculosa. *Surculi* procumbentes, abbreviati, gemmis destituti. *Caules* plures, erecti, bi- rariùs tri-pollicares, nudiusculi, glaberrimi, nitidi,

nitidi, 2—3-flori. *Folia* radicalia 5-partita; surculina trifida ad axillas nuda: segmenta angustè linearia acuta et brevè aristata. *Pedunculi* glabri, nitidi, uniflori, in æstivatione curvati. *Calyx* pube brevissimâ levitèr instructus: laciniæ ovatæ, acutæ, muticæ. *Petala* ovalia, alba, triplinervia, apice extùs rosea: nervis simplicibus, strictis.

This species approaches near to the preceding; but having proved it in cultivation, I am now fully satisfied of its being a distinct species. Its habit is so different, that it may be known at all times of the year by it alone. Its *surculi* are three times shorter than those of *hypnoides*, always quite smooth and green, never red, and destitute of the bulbous buds so remarkable in *S. hypnoides*. The latter species is found alike in the plains, as well as on the tops of mountains. The *S. condensata*, on the contrary, is met with only in elevated regions. It is not confined to one spot alone, but extends over all the Scottish mountains.

106. *S. elongella*, surculis erectis brevibus, foliis radicalibus 5-tri-fidisve; surculinis plerumque tridentatis: dentibus mucronulatis, laciniis calycinis ovatis muticis, petalis obovatis.

S. elongella. *Smith in Act. Soc. Linn.* x. *p.* 340. *Engl. Bot. t.* 2277. (exclus. synon. *Donn Cantab.*) *Compend. Fl. Brit.* 66.

Habitat in Angusiâ Scotiæ in rupibus humidis juxta Lintrathen. *G. Don.* ♃. (v. v. c.)

Herba densissimè cæspitosa, ante anthesin glaberrima, postmodùm villis tenuissimis parcissimè instructa. *Surculi* erecti, breves, rigidiusculi, basi foliis emarcidis crebrè instructi.

instructi. *Caules* erecti, bi- rariùs tri-unciales, subnudi, 2—3-flori, glabriusculi. *Folia* radicalia 5-fida aut trifida, (segmentis lanceolatis,) rarissimè simplicia; surculina plerumque tridentata aut raró indivisa: dentibus latè ovatis, mucronulatis. *Petioli* tenues, dilatati. *Pedunculi* longissimi, uniflori, calycesque pilis glanduliferis levitèr sparsi. *Laciniæ calycinæ* ovatæ, acutæ, muticæ, trinerves. *Petala* obovata, utrinque alba, triplinervia: nervis lateralibus, curvatis, ramulosis; medio simplici, recto.

This species is totally distinct from all the varieties of *S. hypnoides*, one variety of which is often cultivated in the gardens under the name, and mentioned in Donn's *Cambridge Catalogue*. I am therefore happy in having an opportunity of giving a full description of the real plant. In its native habitat it frequently bears long solitary peduncles, terminated by only one flower: but culture alters it in this respect.

107. *S. leptophylla*, surculis procumbentibus longissimis, foliis radicalibus 5-partitis; surculinis tripartitis indivisisve: segmentis lineari-lanceolatis acutissimis divaricatis, laciniis calycinis oblongo-ovatis, petalis spathulatis integris.

S. leptophylla. *Persoon Synop.* i. *p.* 490.

S. retroflexa. *Hortulanorum.*

β. angustifida, tenerior; segmentis foliorum angustioribus.

S. angustifida. *Hortulanorum.*

Habitat α in alpibus Helveticis, et in Cambro-Britanniæ montibus; β in montibus Cambro-Britannicis. ♃. (v.v.c.)

Planta ante anthesin glaberrima, densissimè cæspitosa, posteà laxè diffusa, surculosa, villis viscidis levitèr

sparsa.

sparsa. *Surculi* decumbentes, filiformes, graciles, longissimi, virides, gemmis destituti. *Caules* plures, erecti, 3—4-pollicares, flexuosi, glabriusculi, nitidi, multiflori. *Folia* radicalia profundè 5-partita; surculina tripartita rariùs indivisa, in axillis nuda: segmentis lineari-lanceolatis, acutissimis, aristatis, divaricatis; lateralibus horizontalitèr porrectis. *Flores* cernui, candidi. *Pedunculi* elongati calycesque pilis glanduliferis suppediti. *Laciniæ calycinæ* oblongo-ovatæ, trinerves, mucrone reflexo apice instructæ. *Petala* spathulata, integerrima, triplinervia: nervis simplicibus, rectis. *Stamina* æqualia; *filamenta* alba; *antheræ* aureæ.

This species, as well as its variety β, is cultivated by my friend Mr. Macnab, of the Royal Botanic Garden, Edinburgh, who received them from Wales. I have since my arrival in London had an opportunity of examining flowering specimens of it. The spreading divaricated segments of its leaves are a very striking character, and readily distinguish it from its congeners; but nevertheless it affords sufficient marks besides that to rank it as a species.

108. *S. lætevirens*, surculis procumbentibus elongatis, foliis 5—3-partitisve: segmentis linearibus acutis, laciniis calycinis lanceolatis mucronatis, petalis spathulatis emarginatis.
Habitat in Scotiæ alpibus. *G. Don.* ♃. (v. v. spont.)

Herba lætissimè virens, ante anthesin densissimè cæspitosa, glaberrima, posteà laxè diffusa, surculosa, villis longis adspersa. *Surculi* elongati, procumbentes, gemmis destituti. *Caules* pauci, erecti, tripollicares, glabri, oligophylli, subtriflori rariùs uniflori. *Folia* radicalia 5-partita; surculina omnia tripartita: segmenta linearia,

acuta,

acuta, apice recurvata; *caulina* ima 5-fida, superiora indivisa lanceolata, acuminata. *Flores* campanulati, candidi, in æstivatione cernui. *Calyces* pedicellique pube viscidâ instructi: laciniæ lanceolatæ, trinerves, mucronatæ: mucrone recurvo. *Petala* spathulata, triplinervia, apice emarginata: nervis simplicibus, strictis, viridibus.

This very distinct and elegant species was first discovered by the late Mr. G. Don of Forfar, on the mountains of Angusshire and Aberdeenshire, where it grows on moist rocks in very elevated situations. I have also observed it myself subsequently on hills to the north of Loch-Lomond. Plants of it from that quarter are now growing in the garden of my highly valued friend, Patrick Neill, Esq., Secretary of the Wernerian Natural History and Caledonian Horticultural Societies of Edinburgh.

In concluding this Monograph, I have to make (p. 348) an important alteration in the specific character of *S. ligulata*, namely, to substitute *glabris* for *utrinque hirsutis;* the paginæ of the leaves being quite smooth. A similar alteration is also necessary in the description of the same species.

XX. *On*

XX. *On a Fossil Shell of a fibrous Structure, the Fragments of which occur abundantly in the Chalk Strata and in the Flints accompanying it.* *By Mr. James Sowerby, F.L.S. &c.*

Read November 1, 1814.

Having, with many others, experienced the want of sufficient information to discriminate the genera to which certain shells belong, and not being satisfied with what has been done, especially regarding the genera of fossil shells, I am induced to offer the following observations to the Linnean Society, in the hope that some person, who has more leisure, experience and judgement than myself, will in the course of time favour us with some further elucidation of so interesting a subject.

I hope I may be pardoned for the length of the detail which I am about to lay before the Society, because accurate distinctions and observations are found to be more than ever necessary in the present discerning age, in which such a multiplicity of subjects necessarily arise to improve science.

In a memoir on the mineralogical geography of the environs of Paris, under the article "Chalk Formation," by Messieurs Cuvier and Brongniart, in the *Annales du Muséum d'Histoire Naturelle, tom.* xi. *p.* 293, there arementioned "some fragments of shells, which from their tabular form and fibrous structure cannot be referred to other than the genus *Pinna*; but if we were to infer from the thickness of the fragments the size of the individuals to which they must have belonged, we must conclude

clude that these testacea must have been monstrous. We measured one 12 millimetres (·47 of an inch) thick, while the largest kind of pinna known is only ·08 of an inch thick." Conceiving that I knew these fragments from their fibrous structure, I felt satisfied from the active state of inquiry that it would soon be understood, and for some time I paid very little attention to the subject; but my friends from time to time sending me specimens, none of which gave me the idea of a pinna, I was induced to imagine that this common shelly substance varied much in form, and so much so, that the generic names sent with specimens also varied, and that it would eventually prove to form a distinct genus. In the opinion that the striated fossil spoken of by Brongniart and Cuvier is the same as those sent to me from various places, I am confirmed by a remark of the Rev. W. Conybeare, in the second volume of the *Transactions of the Geological Society*, where I find several specimens figured, and the following observation: "the flat surface of a flint has been originally occupied by a large piece of the *striated shell*, the fragments of which occur so abundantly in the chalk strata and accompanying the flints, *being very commonly considered as mutilated portions of fossil pinnæ.*" At page 179 of the same work it is mentioned, that there are found in the chalk with flints, "a longitudinal transversely rugose ostrea-form bivalve, of a fibrous structure, and fragments of another fibrous shell of a large size and unknown genus." The expressive figures annexed to Mr. Conybeare's paper confirm my suspicions as to the identity of these shells, but not that they belong to the *Pinna* genus; indeed, from a fragment of a hinge mentioned by Cuvier as in the collection of M. Defrance, I am happy to find that, greatly coincident with my own opinion and observations, some doubt has arisen and suspicion been created that these shells are not *Pinnæ*.

About twenty-three years since, before my time was so much

occupied

occupied as it has been during that period in drawing and engraving English botany, &c. in my way to Cambridge I stopped long enough at Royston to run up to a chalk-pit, where I picked up a small specimen of this shell, but altogether the most perfect one I have ever met with, with respect to the information which may be obtained from it. A year or two since, the penetrating Miss Benett, of Norton-House, Wilts, collected in abundance some shells very much resembling a sort of muscle, which she sent me, and of which the better specimens were returned after I had made such observations as I desired. On returning them, I observed to her, that the hinge might be discovered if some of the chalk were carefully removed, and I find the hint was taken. At the same time, upon a careful examination and comparison of my own Royston specimen with a few parts of hinges which I had collected together, and which were generally considered as belonging to this shell, I was enabled to determine with accuracy the proper character and situation of the hinge; from which it became quite easy to see that the difficulty of ascertaining its genus was owing principally to our ignorance of those important points. I now beg leave to lay before this Society the result of my inquiries, and of the comparison of numerous specimens varying in size, shape and locality.

Genus. INOCERAMUS*.

DEFINITION OF THE GENUS. An irregular gibbous beaked bivalve shell, of a fibrous structure. Hinge forming a long furrow, transverse to the beak, lateral, linear, divided by numerous sulci across it. Cartilage partly external, partly internal. No visible muscular impression.

This genus will be found sufficiently distinct from *Perna* and

* Ab ἶς fibra et κέραμος testa.

Crenatula in many particulars, although apparently related to them in its hinge: it consists entirely of a substance composed of parallel perpendicular fibres, and much more conspicuously so than *Pinna* or any other genus.

From specimens in my possession I have made the outlines I now present to the Society, Tab. XXV. It will be easily seen how Cuvier and Brongniart had it not in their power to understand the fragments they found, and how such fragments might mislead any one. They are found in the flints and among the chalk, both hard and soft, in all those places where chalk occurs in England, &c. The shells are from an inch to two feet or more in length, and generally very thin for their size, except at the hinge and extremities. The hinge is generally lost or closely enveloped in the chalk or flint, so as to be concealed, or else it lies in confusion among the fragments. The part behind the hinge or beak is of the finest possible thinness, while some of the other extremities and the hinge are many lines thicker than the more central parts. A shell of about three inches in diameter may be about the tenth of an inch thick; and I have one, which if perfect would be about eighteen inches in diameter, not half an inch thick: there are found fragments even larger, which undoubtedly belong to this genus. I have one five-eighths of an inch thick, from Wiltshire. Thus, if we were to infer from the thickness of the fragments the size of the individuals to which they must have appertained, supposing them to belong to the genus *Pinna*, we must conclude that these testacea would have been *indeed monstrous*: but when it is known that they form a peculiarly characterized genus of a less regular construction, we may form a much more moderate idea of them. Upon a fair calculation, the specimen measuring five-eighths of an inch thick must have formed part of a shell two feet six inches long; whereas, had it been originally part of a pinna, if calculated according

according to the proportions of one in my possession two feet long, the shell to which it belonged must have been at least twenty feet long. Indeed I have fragments of a fossil shell, apparently belonging to this genus, found near Bath and Oxford*, which upon such a calculation must have formed parts of shells at least 120 feet long. I learn from my kind friend Mr. Gideon Mantell, of Lewes, that this species of shell may be traced on the face of some of the chalk cliffs sometimes to four or five feet in diameter. They are accompanied in general by the *Plagiostoma spinosa, tab.* 78. *Min. Conc.*, and some other curious species not before settled.

That species of this genus of which I have chiefly spoken I would distinguish by the specific name *Cuvieri*, in honour of the extensive abilities of the discerning Cuvier.

In many places a fibrous secretion of carbonate of lime, much resembling this, sometimes occurs from very thin to many inches thick, spreading in a stratified manner over many acres, which might from the structure be taken for fibrous shell. See *Brit. Min. t.* 345, middle figure. I have specimens, by the kind attention of Miss E. Benett, found at Osmington, the fibres of which are very thin, and five inches long, yet by various specimens they may be traced to the form of the cone in cone coral (as it is commonly called), a peculiar crystallization. *Brit. Min. t.* 149.

Having said thus much in hopes of assisting and gaining information, I must now add a few words in explanation of the

* *Brit. Min. t.* 345, the upper and lower figures, express such fragments: and on the 1st of June 1818, I had the pleasure of receiving, by the favour of an intelligent and kind friend, from near Caen in Normandy, two pieces, one with the hinge, and another with the muscular impression, both resembling *Ostrea*: possibly these may lead, as the former, to a more marked attention and complete discovery. If an oyster, it is entitled to a name expressing its more extraordinary fibrous distinction.

drawing,

drawing, Tab. XXV. It represents a piece of chalk from Sussex, which had a number of fragments apparently belonging to one large shell, of the inside of which the chalk itself appears to have been a nearly complete cast, showing the undulations as well as the thickness and distance of the overhanging striæ, all corresponding in proportion to smaller specimens: to this I have added, in dots, the outer margin and the hinge in proper proportions, fig. 1. Thus there is no doubt that these shells have been very large; and this leads to the conclusion, that they must have grown very fast, or have been some time in a quiet situation, and in immense quantities, before the catastrophe that enveloped them in the chalk and in the infiltrated flints of large dimensions, as well as in small pebbles. For more accurate information as to the general outline of the large figure, I have added an inner view of the Royston specimen, showing the hinge and parts of the opposite shell broken, the lower edge appearing about the middle, and the rest filled with chalk, fig. 2.; also a view of the outer part of the shell, showing the general contour, fig. 3.

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2
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XXI. *Remarks on Hypnum recognitum, and on several new Species of Roscoea; in a Letter to William George Maton, M.D. F.R.S. V.P.L.S., from Sir James Edward Smith, M.D. F.R.S. Pres. L.S.*

Read December 5, 1820.

My dear Sir,

Permit me to offer you a few remarks, relating to Botany, made last summer in the course of a journey to Liverpool.

I was happy to find the Botanic Garden there in a very flourishing state, and a taste for the scientific study of plants becoming more and more prevalent. The greatest curiosities in that collection perhaps were *Nepenthes destillatoria*, raised, in great plenty, from East Indian seeds, and beginning to show the singular appendage to its leaves; as well as a new *Cypripedium*, and the *Paris polyphylla*, Rees's Cyclopædia, vol. 26, both brought alive from Nepal. *Serapias Lingua* from the south of Europe was scarcely less rare or interesting.

The garden is peculiarly rich in hardy perennial plants, especially of the natural orders of *Compositæ* and *Caryophylleæ*. I never before met with the true *Arenaria saxatilis*, either in a living or dried state, except in the Linnæan Herbarium; what Mr. Hudson and many others have taken for this species being nothing more than *A. verna*.

Among the greenhouse plants I was shown a fine bush of *Willdenovia teres*, in full flower, a plant hitherto unknown to some of my most learned friends in the metropolis, of which I inclose a specimen.

The

The Ferns, chiefly raised from seed by Mr. Henry Shepherd, according to the method of which an account has been published in the Transactions of the Horticultural Society *, are beyond all example copious and luxuriant in the Liverpool stoves; as are the scitamineous plants, to which last one large hot-house is exclusively allotted. There the singular property of some new species of *Curcuma*, perhaps not confined to them alone, of secreting, and retaining in their *bracteæ*, a copious watery fluid, has been first observed. Among the various specimens, both living and dried, of this natural order, which Mr. Roscoe, still intent upon their study, has received from Dr. Wallich of Calcutta, and which are chiefly the produce of Nepal, we have recognised four new species of *Roscoea*, in addition to the *purpurea*, discovered in that country by Dr. Hamilton, on which I founded the genus, in *Exotic Botany*. By these I was enabled to confirm, and in some degree to improve, the generic character, as well as to define all the species, under the superintendence of my learned friend. Till either of us can give a more ample account of these plants, I beg leave here to present you with their generic and specific distinctions.

ROSCOEA. *Sm. Exot. Bot. v.* ii. 97.

Ess. Char. *Anthera* biloba, incurva, terminalis, stylum vaginans; basi bicalcarata. *Corolla* ringens, limbo duplici; labio superiore fornicato. *Calyx* monophyllus, tubulosus.

1. R. *purpurea; Exot. Bot. t.* 108; spicâ foliorum vaginis obvolutâ, calyce obliquo integro.
2. R. *gracilis;* spicâ exsertâ pauciflorâ laxâ, calyce retuso.
3. R. *elatior*; spicâ exsertâ multiflorâ subcoarctatâ, calyce retuso.

* Vol. iii. p. 338.

4. R. *spi-*

4. R. *spicata ;* spicâ exsertâ multiflorâ coarctatâ, calyce emarginato nudo, foliis lanceolatis.
5. R. *capitata* ; spicâ exsertâ capitatâ multiflorâ, calyce bicuspidato ciliato, foliis linearibus.

These new species all partake, more or less, of the habit of the original one, and are well distinguished by characters derived from the calyx, that being the part, in *Roscoea*, in which the real specific differences principally reside.

Returning by Matlock, I spent a fortnight, in the latter part of July, in revisiting that beautiful scenery, which I have, in the course of thirty years, so often explored. Here I had gathered, in 1790, the *Hypnum recognitum ;* but for want of noting the precise spot, I had never been able, in any subsequent visit, to find this rare and elegant moss again ; nor has any other botanist, I believe, ever noticed it in Britain. It grows, copiously enough, among some large massy stones and rocks, overshadowed with trees and brush-wood, behind the principal inn, called the Hall. A steep and devious path, of difficult ascent, leads up the hill to these rocks, which, being mentioned in *English Botany* by the epithet of romantic, have obtained exclusively the appellation of "the Romantic Rocks," and are pointed out by the guides to strangers under that name. Here grow *Paris quadrifolia*, *Polypodium calcareum*, and numerous, though not the most uncommon, *Orchideæ*.

The *Hypnum recognitum* clothes the surface of these shady broken rocks, and fills up many of their interstices, in loose patches or tufts ; but the capsules are rather uncommon. They are perfected in July or August.

This moss being, as I trust, clearly defined in the *Flora Britannica*, and figured in *English Botany, tab.* 1495, I am somewhat

what surprised at the obscurity in which it is involved in the *Muscologia Britannica*, where it is not allowed the rank of a species, or even of a variety, being altogether confounded with the common *Hypnum proliferum.* Neither are the above works, where alone it has hitherto been announced as a British plant, cited at all! I am very sure this omission, like several similar ones, arises from no disrespect, either to these books or their author. The confusion and mistakes in the references given in the *Muscologia*, which I must now correct, prove this article not to have received the usual attention of the able writers of that work, Professor Hooker and Dr. Taylor, to which alone I attribute every omission as well as mistake.

Hypnum proliferum, so admirably delineated in the *Flora Londinensis* of Mr. Curtis, *fasc.* i. *t.* 72, stands in p. 103 of the *Muscologia* with the following references, the figure just mentioned being unaccountably neglected.

" H. proliferum. *Linn. Sp. Pl. p.* 1590. *Turn. Musc. Hib.*
" *p.* 156. *Engl. Bot. t.* 1494. H. tamariscinum. *Hedw. St.*
" *Cr. v.* iv. *t.* 3. *Moug. et Nestl. n.* 41. H. recognitum. *Hedw.*
" *Sp. Musc. t.* 67. *f.* 1—5. H. delicatulum. *Hedw. St. Cr. v.* iv.
" *t.* 35. H. parietinum. *Willd.* ———. *Dill. Musc. t.* 35.
" *f.* 14. *et t.* 38. *f.* 6."

Of these, *Turn. Musc. Hib.* should be 157, a matter indeed of little importance. The synonym is correct, as are the references to Linnæus, and English Botany, and to *H. tamariscinum* of Hedwig; but it should be his *Sp. Musc. t.* 67. *f.* 1—5, as quoted in *Fl. Brit.*, not his *Stirpes Cryptogamicæ. H. delicatulum* of Hedw. *Stirp. Crypt.*, which is *t.* 33 of that work, not 35, and which is also *t.* 83. *f.* 6. of Dillenius, not 38. *f.* 6, is asserted by Hedwig to be undoubtedly a different species; nor have I a doubt that what he received from Dr. Muhlenberg, and has

has figured in detail, is so. This is bipinnate. His *f.* 2. is exactly copied, without acknowledgment, from the figure of Dillenius, *t.* 83. *f.* 6, coloured gratuitously! This is tripinnate. Its coming from Pennsylvania does not prove it the same species. The plant of Dillenius is indeed what Linnæus meant for *H. delicatulum*; but there is no specimen in the Linnæan Herbarium, nor have I examined that which I presume to be preserved at Oxford. This *delicatulum* may be a small variety of the *proliferum*, which species is found in various quarters of the globe; but, though well aware of that circumstance, I durst not, in the *Flora Britannica*, refer to this plant of Dillenius, and still less to the obviously different bipinnate one of Hedwig. But I have cited, without scruple, the Europæan *H. delicatulum* of Schrader's *Spicilegium* 73, and *H. delicatum* of Ehrhart's *Cryptogamia*, *n.* 301, from a comparison of specimens. Both these synonyms are omitted in the *Muscologia*. Dillenius's *tab.* 35. *f.* 14, is unquestionably right, as quoted by all authors. The synonyms of Haller, Vaillant and Morison, to be found under this species in *Fl. Brit.*, are well worthy of notice, though left out of the *Muscologia*. Vaillant's representation of *H. proliferum, t.* 25. *f.* 1, though correct, being smaller, and far less specious, than that of *H. splendens*, *t.* 28. *f.* 1, and especially *t.* 29. *f.* 1, has caused a general confusion amongst foreign botanists; cleared up, I trust, by authentic records, and not without some pains, in the *Flora Britannica*; which work might perhaps, according to general usage, and not without advantage, have been quoted in the *Muscologia*.

So much for the real *H. proliferum*. The rest of the synonyms, though not separated, belong to the *recognitum*, just now *recognised*, after a lapse of thirty years, at Matlock.—These are,

H. recognitum. *Hedwig. Stirp. Crypt. v.* iv. *t.* 35, and *Sp. Musc. p.* 261; not *t.* 67. *f.* 1—5 of the latter work; neither is

 it

it *delicatulum* of the *Stirp. Crypt. t.* 35, which ought, as above mentioned, to have been quoted *t.* 33. It is indeed *H. delicatulum* of Willdenow's *Prodromus*, and, according to Hedwig, of the generality of Europæan Floras on the continent. The plate of *Engl. Bot. t.* 1495, is not noticed in the *Muscologia.*

This moss is probably to be found in other parts of Britain, though as yet not noticed by any botanist. I am very sure my friends, whom I have thus freely corrected, can never have examined a specimen, or they could not have confounded it with the *H. proliferum*, from which it differs in not being above half so large, of a less rich and beautiful green, with only bipinnate, not tripinnate, stems, and a short conical lid, instead of one with a long taper beak. Having now compared these two species, in a fresh state, I can speak to their distinctions even more decidedly than I could in the *Flora Britannica.*

The *Cyathea fragilis* of *Fl. Brit.* (*Polypodium fragile* of Linnæus) assumes many different appearances at Matlock, insomuch that I had flattered myself with having found a new species there in the autumn of 1818. But having sowed the seeds of this and the common kind, according to Mr. Henry Shepherd's method, the plants produced, now growing in perfection, prove not even varieties of each other. *Polypodium calcareum* was raised at the same time; as well as a kind of *Aspidium*, from the high rocks on Cromford moor, like the common *dilatatum*, but smaller, of a darker green and more rigid habit. This last is a mountain plant, found also in Scotland, and I have often thought it might prove a distinct species. Notwithstanding all possible care, I have not been able to cultivate it with any success, so as to determine this point.

I remain, &c.

Norwich, Nov. 30, 1820. J. E. Smith.

XXII. *Re-*

XXII. *Remarks on the Genera Orbicula and Crania of Lamarck, with Descriptions of two Species of each Genus; and some Observations proving the Patella distorta of Montagu to be a Species of Crania. By Mr. George Brettingham Sowerby, F.L.S.*

Read March 17, 1818.

THE opportunity of addressing the following observations to the Linnean Society of London, has been lately afforded me by a circumstance, very common indeed in its kind, though at the same time I may be allowed to say fortunate, as far as regards the subject of the present communication and its results.

Among a quantity of ballast lately brought to the parish of Lambeth for mending the roads, were several stones, evidently collected on the sea-coast, and which, in the numerous irregularities of their surfaces and the cavities with which they were pervaded, contained a considerable number of small shells, some of them of singular characters and of uncommon and little known species. I have made several attempts to ascertain what part of the world the ballast was brought from, but all my inquiries have hitherto proved fruitless; though from some slight circumstances I have reason for supposing that it has been brought from the northern coast of Africa. I could not, however, consider this a sufficient reason for withholding the information I thus have it in my power to communicate, more especially, as the discovery among the shells thus procured, of a species of Lamarck's genus *Orbicula*, has led to a further discovery of the real character and

proper

proper situation in the natural system of the shell described by Montagu under the name of *Patella distorta*, *Linn. Trans.* xi. *p.* 195. *t.* 13. *f.* 5.

The first specimen I had ever seen of the genus *Orbicula* was sent to my father some months ago by Mr. Holloway, from Portsmouth; it was found by him precisely under the same circumstances as those under which I have myself obtained specimens: but this specimen was so very much distorted, and withal so new in its appearance, that it was impossible to form an opinion upon it.

The next specimen of this genus that it has fallen to my lot to examine, was in the possession of Mr. Mawe, from whom I am informed it has passed into Lady Wilson's cabinet: this is another species, very much resembling, if it be not, *Orbicula norvegica*; it is larger than any of the former, and was attached to the convex outside of a grey flint pebble, and not defended by a cavity in the stone. The dried animal remains within, by which we are enabled to show that it belongs to the family of terebratuloid shells, the *Branchiopoda* of Cuvier.

The discovery above mentioned, of a number of specimens of the genus, has led to a more intimate acquaintance with its characters and habits; and as the means are thus offered to our use, it may not be improper to give an amended generic character, and such additional information concerning the *genus* as I have been able to collect from the specimens themselves.

ORBICULA.

Bivalve, inequivalve, nearly orbicular, compressed, fixed; *upper valve* patelliform, with four internal muscular impressions, two rather large and approximating near the centre, and two smaller and more distant placed near the posterior margin. *Lower valve* flat, with corresponding muscular impressions

pressions and a rather obtuse process placed at the inner end of a fissure near the centre. Hinge none.

The animal has two ciliated arms or tentacula, and adheres by a muscle or ligament, which passes through the fissure.

The character of the genus given by Lamarck is as follows:

"Orbicule. Coquille orbiculaire, applatie, fixée et composée de deux valves, dont l'inférieure très mince adhére aux corps qui la soutiennent. Charnière inconnue.

"Orbiculier. Acephale sans pied et sans prolongemens tubuleux; mais muni de deux bras alongés, frangés, qui s'étendent au gré de l'animal, et qui rentrent dans la coquille en se roulant en spirale."

It is here observable, that Lamarck says the animal has no foot; but I apprehend it would not be improper to call the muscle or ligament which passes through the fissure near the centre of the lower valve, and which is the only part by which the shell is attached, by that name; it certainly very much resembles the foot of the animal inhabitant of *Patella*.

The only species of this genus, with which we are at present acquainted, either by description or figure, is the one upon which Lamarck has founded the genus: he calls it *O. norvegica*, and it is described and figured by Müller in *Zoologia Danica* under the name of *Patella anomala*: it is distinguished from *O. lævis* by its having numerous radiated decussating striæ, of which that species is destitute. How Müller, who knew well all its characters, and had examined it in its living state, could do so much violence to nature as to name it *Patella**, I confess myself completely at a loss

* "It is not easy to understand why that famous naturalist has so arranged it among the *Patellæ*, instead of constituting a particular genus, since it does not belong to the genus *Patella*, not only as being a bivalve, but also from the difference of the animal inhabitant.

"The

a loss to imagine; he does however seem, by his specific name *anomala*, to have doubted the propriety of placing it in that genus.

I now close my observations upon this subject, only adding the specific characters of the *O. norvegica*, and the newly-discovered species which I designate *O. lævis*.

Orbicula lævis.

O. valvulis tenuibus lævibus.

Tab. XXVI. *f.* 1.

Habitat in mari, saxis adhærens.

Orbicula norvegica.

O. valvula superior striis plurimis elevatiusculis ex vertice ad marginem decurrentibus.

Tab. XXVI. *f.* 2.

Syn. *Lamarck Anim. sans vertèbr.*

Müller Zool. Dan. i. *t.* 5. *p.* 14. Patella anomala.

Habitat in mari, ad littora, saxorum in cavitatibus affixa.

Obs. When any part of the *lower* valve does not lie close to the stone, the radiating striæ may be perceived decussating the striæ of growth.

The following observations, principally upon the genus *Crania* of Lamarck, will be found to be in a great measure connected

"The shell is very small, sprinkled all over with elevated points, which make it rough to the touch: its upper valve is larger, and has a projecting apex; the lower valve adheres to old shells and other hard substances in the depths of the North Sea.

"The animal which inhabits it is represented by two red masses, with two elongated arms, blue and fringed; the fringes thick, rather curled, yellow. It seems that Müller had not the means of observing it with sufficient accuracy, for he does not describe it with that precision which is generally observable in all his writings. He does not even speak of the hinge, of which it is true that he had no suspicion according to the idea which he had formed of the genus of the shell." *Bosc, vol.* ii. *p.* 243.

with

with the foregoing, and have been elicited by the same discovery.

From an attentive examination of two specimens of the shell described and figured in the *Linnean Transactions*, under the name of *Patella distorta*, I was led to suspect that it might be a bivalve shell, and probably related to the genus *Orbicula*, and belonging to the family of *Terebratulidea*. I have it now in my power to show that this suspicion is verified; for Mr. Bullock has obligingly communicated a stone from one of the Shetland islands, to which are attached several specimens of this shell (*Patella distorta*). Upon lifting one of these, I was not a little pleased to discover, in a dry state, the two fringed arms or tentacula common to, and characteristic of, the *Terebratulidea*; and, firmly adhering to the stone, another valve, white, extremely thin, except at its edges, and having *four* muscular impressions corresponding with those of the upper brown valve; but two of these muscular impressions are certainly so near together, that I do not wonder that, upon a slight examination, Lamarck should have described the genus *Crania* as having in the lower valve three oblique perforations. It therefore appears that this shell, instead of being a *Patella*, may properly be considered a bivalve shell, and that it belongs to Retzius's genus *Crania*, of which Lamarck gives the following characters:

"Coquille composée de deux valves inégales, dont l'inférieure presque plane et suborbiculaire est percée en sa face interne de trois trous obliques et inégaux. La supérieure, très convexe, est munie intérieurement de deux callosités saillantes."

These characters however do not appear to me quite satisfactory. I would suggest the following as an amended generic character.

CRANIA.

Bivalve, inequivalve, nearly orbicular, compressed, fixed; upper

 valve

valve patelliform, with four internal muscular impressions; lower valve adhering, nearly flat, with four corresponding muscular impressions, two near the centre, approximating and nearly united, and two near the posterior margin, distant. No hinge.

Lamarck does not seem to have been acquainted with the animal inhabitant of this genus; and indeed our knowledge of it must necessarily remain very limited, until we shall have an opportunity of examining it immediately upon its being taken from its native deeps. All that can be distinguished in the dried specimen are the four ligaments or muscles which attach the two valves together, and the two fringed arms or tentacula.

It is obvious that this genus differs very materially from *Orbicula*, particularly in the manner in which it is attached; the whole of the lower valve of *Crania* being firmly attached and adhering closely to the stone, whereas the *Orbicula* adheres only by an apparently cartilaginous *foot*, which passes from within through the elongate aperture near the centre of the lower valve, and spreads over a surface of the stone equal to about one-eighth of the surface of the shell. In the appearance of the dried animal very little difference is observable between the two genera.

Lamarck gives as the type of the genus *Crania*, the *Anomia craniolaris* of Linné, a shell which is certainly very little known in this country. I have however seen specimens of it on a coral from the Mediterranean; and on some of these, the impressions on the attached valve, on account of their having been some time exposed, as I conceive, and being more liable to decomposition than the other parts of the shell, have been corroded away in part, so as to appear rather hollow. I hope it will not be thought irrelevant if I here attempt the characters of the two species of this genus with which I am at present acquainted.

1. CRANIA

1. CRANIA PERSONATA.

C. valvula superior tenuis lævis. TAB. XXVI. *f.* 3.

SYN. Anomia craniolaris. *Linn.*, *&c.*

——— turbinata. *Poli*, ii. *p.* 189. *t.* 30.

Patella Kermes. *Humphrey.*

——— distorta. *Mont. Linn. Trans.* xi. *p.* 195. *t.* 13. *f.* 5.

Crania personata. *Lamarck*, *Anim. sans Vert.* 138.

Habitat in mari Mediterraneo, coralliis adfixa; et in mari Scotico, saxis adhærens.

Humphrey, who described the upper valve under the name of *Patella Kermes* many years ago, afterwards discovered his error; Montagu never had an opportunity of examining the shell in its natural situation, or he would have undoubtedly discovered his. The only difference observable between the specimens from Shetland and those from the Mediterranean, is in the thickness and irregularity of the lower valve; those from the latter sea being very thick and irregular; whereas, those from Shetland are much thinner, and more regular in their shape; but this difference I imagine may be easily accounted for from the different situation of the respective specimens; the one being found upon rugged old corals, and the other being attached to a comparatively smooth stone*.

2. CRANIA ANTIQUA.

C. valvula superior radiatim striata, striis elevatis, ex vertice ad marginem decurrentibus; valvula inferior posticè producta. TAB. XXVI. *f.* 4.

* Since this paper was read, I have seen Poli's figure of this shell, which he calls *Anomia turbinata*; he also gives several views of the animal inhabitant, under the name of *Criopus*, which is certainly strongly corroborative of my expressed opinion, founded upon the observation mentioned above, that it belongs to the family of *Terebratulidea*. I am concerned, however, to be under the necessity of stating, that Poli has confounded Müller's *Patella anomala* (the Orbicula of *Lam.*) with it, expressing his astonishment at Müller's not having observed the lower valve, and naming it *Patella*.

 This

This is a fossil species, of which the two valves have been found in considerable abundance, but always separate, in a compact marly stratum, in the department de la Manche in Normandy, and communicated to my father by our very liberal friend C. Duherrissier de Gerville.

I had named the above species *C. producta*; but since the Paper was read I find it has been described by M. Defrance, and figured in the *Dictionnaire des Sciences naturelles* under the name of *C. antiqua*, which I have therefore adopted. It is also described in Lamarck's *Hist. Nat. des Anim. sans Vert. t.* vi. *part* 1. *p.* 239.

The delay which has attended the printing of this Paper gives me an opportunity of noticing two or three mistakes into which M. de Blainville and M. de Lamarck have fallen, upon receiving some specimens of the *Orbicula norvegica*. M. de Blainville* has confounded it with *Patella distorta* of Mont., and also with the *Criopus* of Poli, a name given by Poli to the animal alone of the *Crania personata*; but he refers it rightly to *Patella anomala* of Müller, and to the genus *Orbicula* of Lamarck.

Lamarck has fallen into the same mistake in referring Poli's *Anomia turbinata* to his own genus *Orbicula*; but, unhappily for science, he is obliged to see with the eyes of others; and this circumstance will account for his having made a new genus, constituted from a specimen sent to him by my father, of the *Orbicula norvegica*, under the name of *Discina*, and even for his having placed it in another family. The genus *Discina* ought therefore to be wholly erased from Lamarck's *Hist. Nat. des Anim. sans Vert. t.* vi. *p.* 236; and the description and greater part of the observations under it, might with propriety be transferred, to replace the description of his *Orbicula*, the observations to which might remain.

* *Bull. des Sciences,* May 1819.

REFE-

Fig. 1.
a
b
c
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Fig. 2.
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b
c
d
e
f
Fig. 3.
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b
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Fig. 3 e
Fig. 4
a
b
c

REFERENCES TO THE ACCOMPANYING FIGURES.

Tab. XXVI.

Fig. 1. Orbicula lævis.

a. Attached to a grey flint pebble, which is nearly coated by the root of an *Isis*.

b. Another view, to show the elevation.

c. Inside of the upper valve, showing the two fringed arms.

d. Inside of the lower valve.

Fig. 2. Orbicula norvegica.

a. A very young specimen.

b. A full grown one.

c. Specimen showing the fringed arms extended like rays beyond the shell.

d. Inside of the upper valve.

e. Inside of the lower valve.

f. Under part of lower valve.

Fig. 3. Crania personata.

a. Piece of sandstone, with several specimens of various sizes attached to it, from Orkney.

b. Inside of the upper valve, do.

c. Inside of the lower valve, do.

d. Ditto, with the dried animal, do.

e. Inside of a lower valve, from the Mediterranean.

Fig. 4. Crania antiqua.

a. Outside of upper valve. *b*. Inside of do.

c. Inside of lower valve.

XXIII. *A Com-*

XXIII. *A Commentary on the Hortus Malabaricus, Part I. By Francis Hamilton, M.D. F.R.S. and L.S.*

Read May 1, 1821.

TENGA, *p.* 1. *fig.* 1—4.

Cocos nucifera of Willdenow.

THE resin mentioned by Syen in the notes, as produced by this palm in Ceylon, seems doubtful. I never heard of such; and suspect that what he saw was the produce of some other tree, perhaps of the *Sterculia Balanghas*, which in Malabar is called mountain coco-nut. The place of growth assigned to this tree by Willdenow is improper. It should have been, "Habitat ubique in maritimis inter tropicos præsertim arenosis."

CAUNGA, *p.* 9. *fig.* 5—8.

Areca Catechu of Willdenow.

The figure of Plukenet (*Phyt. t.* 309. *f.* 4.), quoted for this plant, and no doubt intended by him to represent it, seems to me to have been taken from some other, which had been sent to him by mistake. It evidently represents a young palm, as newly shot up from the ground, but seems rather a *Phœnix* or *Elate* than an *Areca*.

The name *Areca* has probably been taken from Garzia ab Horto, who, according to the commentator, says that the nut, not only in Malabar but in other places, is by people of rank called

called *Areca.* Who these nobles were I cannot say; but I presume they were Portuguese, who obtained the name *Areca* by some misconception; for it is not used by any native of India that ever I heard. The specific name *Catechu* (in the Encyclopédie *Cathecu*) evidently arises from a mistake, originating I believe with Dale, who imagined that the *Terra Japonica*, or *Catechu* of European druggists (*Kath* of the natives), was the produce of this palm; an error once very common, but from which the *Hortus Malabaricus* is free.

The most remarkable quality of this nut, and that for which it is so much used in India, is its narcotic or intoxicating power, not noticed by the Brahmans of the Dutch Governor, who indeed often overlooked the real qualities of plants, and ascribed to them such as are at least very doubtful.

Carim—Pana, *p.* 11. *fig.* 9.

Borassus flabelliformis, fœm. Willd.

Am Pana, *p.* 13. *fig.* 10.

Borassus flabelliformis, mas. Ibid.

The uses for which this palm is so much employed in India, are totally omitted in this work, which on such subjects is very superficial and incorrect. The leaf mentioned by Syen in his note, evidently did not belong to this palm, but to the *Corypha* described in the *Hortus Malabaricus, vol.* iii. *p.* 1.

Schunda Pana, *p.* 15. *fig.* 11.

This is quoted in the *Encyclopédie Méthodique* and in Willdenow for the *Caryota urens.* As however the *Seguaster major* of Rumphius (*Herb. Amb.* i. 64. *t.* 14.) is also quoted by both authorities, and was indeed considered by Rumphius as the same with

with the *Schunda-Pana*; yet, as I have great doubts on this head, and think the two plants different, I do not know which Linnæus meant. I know the *Schunda Pana* well, and found it common in the eastern parts of the province of Bengal, as well as on the western mountains of the Indian peninsula; but I no where observed those large leaflets, that Rumphius represents as placed along the middle rib of the leaves. The distinction is perhaps of no great consequence, as the uses and qualities of both kinds seem to be nearly the same, and to be excellently described by Rumphius.

Bala, *p.* 17. *fig.* 12—14.

This is usually quoted as the *Musa paradisiaca;* and when Linnæus wrote the *Flora Zeylanica*, he knew no other species. No plant having had more care bestowed on its cultivation, a vast number of varieties have been reared, and are continued by being raised from offsets taken from the root. In one of these varieties, the *Schundila Canim Bala* of the *Hortus Malabaricus* (p. 20), the male spathes fall off as the fruit ripens, leaving the whole spadix, that remains, covered with fruit. The same happens in a great many other varieties, especially such as are most fitted for eating without the preparations of cookery, and was supposed by Linnæus to afford room for a specific distinction, on which he founded the *Musa sapientum*; and subsequent authors have increased the number by adding the *Musa maculata*, and *Musa rosacea*, mentioned by Willdenow. The author of the *Encyclopédie* (Suppl. i. 569.) judged wisely in rejecting these as species, and, in my opinion, should have followed the same course with the *Musa sapientum* of Linnæus, none of the varieties of which differ more from the varieties of *Musa paradisiaca* than a codling apple does from a pepin. Dr. Roxburgh was finally of the same opinion with me; for although he described a *Musa sapientum* and a *Musa paradisiaca*, yet he acknowledges (*Hort. Beng.*

Beng. 19, *note* 1), that they are mere varieties. In fact, he was so puzzled by circumstances, that he quotes the *Hortus Malabaricus* for neither plant: for the fruit-bearing tree in figure 12 has the male spathes deciduous, while in figure 13 they are represented as persistent. As these two species should be united, and as the names *sapientum* and *paradisiaca* are liable to some objections, the Latin name *Pala*, used by Pliny (*Hist. Nat. lib.* xii. *sect.* xii.), should be revived; for there can be no doubt that this is the *Arbor Pala;* and Pliny's example shows the urbanity (to use the Roman phrase) of adopting into botanical Latin the foreign names of plants; for the word *Pala* is no doubt the same with the *Bala* of Kærulu or Malabar. How much better are such names than the monstrous would-be Greek words ending in *pogon*, *carpos*, *lobus* and the like, with which we are now overwhelmed! Rheede was indeed very unfortunate in his choice of names, selecting in general the most barbarous appellations of the vulgar dialect in preference to the polished words of the Sanscrita. But in numerous instances Rumphius has shown how even the most uncouth words may be polished; and it is much to be regretted, that the taste of Linnæus was suited to approve most of Rheede's selection.

AMBA PAIA, *p.* 21. *fig.* 15, 1.

Carica Papaya, *mas* auctorum.

PAPAIA MARAM, *p.* 23. *fig.* 15, 2.

Carica Papaia, *fœmina*.

Carica, being the Latin name for a kind of fig, seems to have been ill applied to this genus.

Every thing that I have seen induces me to believe, with Rumphius and Dr. Roxburgh, that this tree is an exotic in India. Few plants have less affinity to others than this; so that it

it is very difficult to say to what natural order it should be referred. Jussieu considers it allied to the *Cucurbitaceæ* which have the germen above the calyx; but its erect woody stem, and want of tendrils, seem strong objections. I think that it rather comes nearer some of the *Euphorbiæ*, especially to the *Jatropha*, several species of which, like the *Papaya*, when wounded, pour forth a limpid juice of very peculiar qualities. The affinity with the *Euphorbiæ* is confirmed by the circumstance of Linnæus having mistaken the *Aleurites triloba* for a *Papaya*, which he called *Posoposa*. See *Willdenow Sp. Pl.* iv. 815.

ILY, *p.* 25. *fig.* 16.

Linnæus, like the older botanists from the time of Pliny at least, considered this plant as a species of *Arundo*. These older writers knew it as the vegetable which produced a stony substance used in medicine, and called *Tabashir* or *Mambu;* and *Mambu*, corrupted into *Bambu*, came to be the name by which the tree itself was known in Europe (Plukenet *Alm.* 53.), although it was never known by any name like this in an Indian language. On the discovery that this plant could not be an *Arundo*, it was formed into a new genus, which Retzius called *Bambos*, from the specific name previously given by Linnæus; but Jussieu, rejecting this ill-formed word, adopted *Nastus*, by which name the *Arundo indica* is said to have been known to the Greeks. Willdenow, very unwilling to adopt anything from Jussieu, and disliking the *Bambos* of Linnæus, not very tractable in the Latin declinations, made a new word, *Bambusa*; and M. Palisot de Beauvois (*Encycl. Meth. Sup.* v. 494.), on observing some slight differences in the flower, made two genera, *Bambusa* and *Nastus;* and probably some other person will make as many genera as there are species; for I have observed no two species in which there were not considerable differences in the flower.

The

The circumstance of producing the substance called *Tabaxir* or *Tabashir*, cannot, I believe, be considered as affording a specific character; because I am persuaded that this substance, very minutely divided, pervades most parts of all the species that I have seen; and it is only under particular circumstances that it collects in the hollow joints of the plant, forming considerable masses, such as are employed as a drug. Many thousand plants may be cut without finding a morsel: and, so far as I could learn, it is chiefly found in woods or thickets consisting mostly of it alone, and growing on a dry stony soil, where the plant does not reach to a great size, and has a strong tendency to flower; for the cultivated *Bambu* very seldom does so. Most of the older writers taking the production of this drug as their specific character, their synonyma may be rejected, as common to several species.

Linnæus contented himself with making one species; and in the *Flora Zeylanica* quoted for this the *Ily* of the *Hortus Malabaricus*, adding no reference to other authors that could render us doubtful of what he meant. Since then, however, to the *Ily* of the *Hortus Malabaricus*, botanists in describing the *Bambusa arundinacea* have added the *Arundarbor vasaria* of Rumphius. As I consider the two plants quite distinct, I am at a loss to say which is the *Bambusa* or *Bambos arundinacea* (Willd. *Sp. Pl.* ii. 245. *Enc. Meth.* viii. 701). Dr. Roxburgh seems to have been aware that they could not be the same, and only quotes the *Ily* for his *Bambusa arundinacea* (*Hort. Beng.* 25.); but then he seems to have some way imagined that the *Ily* represented the *Bambu* most commonly planted about villages, and which is destitute of thorns, while in fact the *Ily* has thorns, and I have little doubt is the same with the *Bheru* or *Beheor Bangsa* of the Bengalese, which in the *Hortus Bengalensis* is quoted for Dr. Roxburgh's *Bambusa spinosa*. It is true that for this Dr. Roxburgh also

 quotes

quotes the *Arundarbor spinosa* of Rumphius (*Herb. Amb.* iv. 14. *t.* 4); but in this I think he was mistaken, the plant of Rumphius being at times almost scandent, and even its smallest branches are armed with spines; while the *Bheru* is the most erect *Bambu* that I have seen, and the spines are chiefly confined to the principal stem. Rumphius himself (p. 11.) thought that the *Ily* of Rheede was his *Arundarbor fera* (p. 16.), in which I entirely agree with him; and I think that the *Bheru Bangsa*, which I have described, is the second variety of Rumphius with a lofty straight stem. The figure in Rumphius (iv. *t.* 4.), referred to by Burman as that of the *Arundo fera*, I cannot well reconcile with the description, and doubt of its even representing any *Bambusa*. Further, I am persuaded that the *Arundarbor vasaria* of Rumphius is the *Bambu* most commonly cultivated in Bengal, and is probably the plant which Dr. Roxburgh called the *Bambusa arundinacea*. I shall now content myself with mentioning the synonyma belonging to the *Ily*, with such circumstances as may serve to distinguish it as a species.

Bambusa spinosa. Hort. Beng. 25. B. trunco erecto spinoso, vaginis petiolaribus hispidis.

Arundarbor fera secunda. *Rumph. Herb. Amb.* iv. 14; sed non *fig.* 4. quæ vix speciem Bambusæ repræsentat.

Arundo arbor. *Linn. Fl. Zeyl.* 47.

Arundo Bambos. *Linn. Sp. Pl. in Burm. Fl. Ind.* 30.

Arundo indica arborea maxima, cortice spinoso, Tabaxir fundens. *Burm. Thes. Zeyl.* 35.

Bheru Bangsa Bengalensium.

Colitur ad pagos Indiæ rariùs; in sylvis præsertìm Indiæ australis frequentior.

Truncus elatus strictus, ad nodos spinis validis geminis vel ternis armatus. *Rami* brevissimi, pinnatiformes. *Vaginæ* hispidæ,

pidæ, ultra folium ore ciliato productæ. *Folia* suprà nunc nuda, tunc scabra et pilis raris aspersa; subtùs nuda. *Panicula* terminalis laxa, ramis longis, pendulis, raris, articulatis, indivisis. *Spiculæ* ad articulos confertæ, lanceolatæ, imbricatæ floribus alternis, distichis. *Flores* in singulis spiculis inferiores neutri valvula interiore minuta; superiores masculini bivalves, valvulis ovatis, equitantibus. Valvula exterior maxima, deorsum convexa; interior tenuis, deorsum concava, marginibus ad angulum inflexis, angulis ciliatis. *Stamina* sex.

Femininam vel Hermaphroditam non vidi florentem.

MALACCA SCHAMBU, *p.* 27. *fig.* 17.

NATI SCHAMBU, *p.* 29. *fig.* 18.

Jambu is a Sangscrita word, the first letter being pronounced as in English: but, as this sound is not given in the Dutch language, Rheede writes the word *Schambu*. The Portuguese seem to have written it *Gambu*; but in all the pronunciation is nearly alike.

Rheede begins his description by remarking that there are two kinds of *Schambu*; the *Malacca*, called so from having come from that country; and the *Nati Schambu*, of which he gives no explanation, but I conceive the meaning to be this. In the vulgar dialect of Malabar, *Nada* or *Nata* is analogous to *Desa* of the Sangscrita or Hindwi, and signifies a country or territory; while *Nati* or *Desi* signifies any thing belonging to the country or indigenous. *Nati Schambu*, therefore, is the indigenous *Schambu*. I am convinced, however, that by some misunderstanding Rheede has reversed the names: and that the tree which he calls *Malacca Schambu* is indigenous in Malabar, as in all parts of India Proper; while the *Nati Schambu* is a native of the

the Eastern Islands, and in Malabar is found only about European settlements. Much therefore of what is said by Syen, in the note concerning this species, must be considered as belonging to the *Nati Schambu*. This has given rise to many difficulties in quoting the older accounts of the two kinds; for, among the later botanists, there can be no doubt that the *Malacca Schambu* is the *Eugenia Jambos*, while the *Nati Schambu* is the *Eugenia malaccensis;* which shows that Linnæus knew the real country of at least the latter plant.

Of the synonyma quoted for the *Malacca Schambu* in the *Flora Zeylanica* by Linnæus, that of *Bauh. Pin.* 441. may be considered as belonging to the *Nati Schambu.* The same may be affirmed of the *Jambosa domestica* of Rumphius (*Herb. Amb.* i. 121. *t.* 37), first introduced by the elder Burman among the synonyma of the *Malacca Schambu.* This was corrected by his son in the *Flora Indica* (114.), while he introduced another error equally great, in supposing the *Jambosa silvestris alba* of Rumphius to be the same with the *Eugenia Jambos.* This error continues in Willdenow; and the authors of the *Enc. Meth.* (iii. 197.) do not venture to reject it altogether, but consider the two plants as varieties. This *Malacca Schambu* or *Eugenia Jambos*, indeed, is not at all mentioned by Rumphius, except in a paragraph (iv. 123.) where he says that a tree of it stood before the castle of Victoria in Amboyna, where it was called by the Portuguese name *Jambo d'agoa rosada.* From this I conclude that it was an exotic, and had been introduced by the Portuguese from India Proper, where it grows in abundance: although Rumphius, from the name given to it by Rheede, considers it as having come from Malacca. As properly synonymous with this species we may add the *Jambos fructu luteo, mespili forma odorata, Gambu dicta. Burm. Thes. Zeyl.* 125. This indeed is the only form in which I have seen the tree; and I suspect that those who describe it

with

with a pyriform fruit confound it with the *Jambosa domestica* of Rumphius, both having the smell of roses.

With respect to the synonyma of the *Nati Schambu*, or *Eugeniam alaccensis*, we may observe that the *Jambos sylvestris fructu rotundo cerasi magnitudine* of Burman (*Thes. Zeyl.* 125) quoted by Linnæus in the *Flora Zeylanica* (187), and by the younger Burman (*Fl. Ind.* 114.), may be safely omitted, as has been done by Willdenow. It is probably the same with some of those described by Rumphius under the name of *Jambosa sylvestris.*

These difficulties in the synonyma seem to have prevented both the *Hortus Malabaricus* and *Herbarium Amboinense* from being quoted in the *Hortus Bengalensis* for either the *E. malaccensis* or *E. Jambos.*

Champacam, *p.* 31. *fig.* 19.

There is no doubt of this plant being the *Michelia Champaca* of authors: but there is strong reason to doubt the propriety of separating the *Michelias* from the *Magnolias.* The number of petals is not a sufficient character, as it is liable to considerable variation even in the same individual; nor can the fruit of the *Michelia* be called a berry, in the sense that word now obtains. There is a fleshy juicy aril round the seeds: but still the fruit consists of two valves; and in a *Michelia* which I have seen, and which it is very difficult to distinguish by a well defined character from the *Champaca*, the valves of the capsule are completely dry and hard, and finally, the habit or general appearance of the *Michelias* is not different from that of the *Magnolias.*

Elengi,

Elengi, *p.* 33. *fig.* 20.

Mimusops Elengi of authors.

Maniapumeram, *p.* 35. *fig.* 21.

Nyctanthes arbor tristis of authors: called *Scabrita* by some late innovators.

Mania is probably the proper native name, Pu signifying *flower*, and Maram *tree*. In Pegu I was shown this as the tree on which the inhabitants reared a silkworm, probably the same with the Tessar of Bengal, on which account the people there call it *Po-za bæn, Bombycis arbor*. In India Proper the tube of the corolla is used as a dye.

Conna, *p.* 37. *fig.* 22.

Cassia fistula of authors.

Gærtner was perhaps excusable in thinking that the *Cassia* of Linnæus should be divided into two genera, *Cassia* and *Senna*, as Tournefort had done: but for what reason Persoon proposes to change the decent enough name *Cassia* into the uncouth *Cathartocarpus*, I cannot say. Bad as this name is, Willdenow has lately contrived a worse, and the *Cassia* is now become *Bactyrolobium*. I must further observe, that the Linnæan generic character, taken from the stamina, distinguishes these plants from all others with facility: while the limits between the *Cassias* and *Sennas*, drawn from the structure of the legume, are not easily to be defined even in species which differ remarkably in their general appearance. Thus the fruit of the *Cassia sophera* does not properly open into valves, and is divided by transverse membranes into many cells, somewhat like the *Cassia fistula*; but in other respects it resembles much the true *Senna*, while many species, in size and splendour of flowers, resemble the *Cassia fistula*, but produce a leafy legumen opening with two flat valves.

valves. The cathartic pulp is by no means universal among the species best defined as *Cassias*.

BALAM PULLI, *p*. 39. *fig*. 23.

Tamarindus indica auctorum.

The specific name is a vile pleonasm, as being contained in the generic appellation, which signifies the Date of India.

CODDAM PULLI, *p*. 41. *fig*. 24.

It is now generally admitted that Linnæus was wrong in considering this as the tree which produces the true *Gummi gutta* or Gamboge; and that he was also wrong in separating it as a genus from *Garcinia*. As he was in an error respecting the *Cambogia*, modern botanists, in uniting the two genera, have acted right in retaining the name *Garcinia*; and when Willdenow made the *Cambogia* a *Garcinia*, it would have been better if he had not retained *Cambogia* as the specific name, as it still leads to error; for I believe there is no further ground for supposing the drug called Camboge to be produced in Ceylon.

ATTY ALU, *p*. 43. *fig*. 25.

In the *Flora Indica* of Burman (226.) this name is read *Altyalu*, which is retained in Willdenow, and even in the generally accurate *Hortus Kewensis*, probably owing to the authors having quoted on the authority of Burman without examining the *Hortus Malabaricus*.

The *Atty-alu* is usually conjoined with the *Grossularia domestica* of Rumphius, and quoted for the *Ficus racemosa Willd. Sp. Pl.* iv. 1146. *Enc. Meth.* ii. 496. I think, however, that the two plants are different; and although the *Grossularia domestica* is quoted in the *Encyclopédie* with doubt, I suspect that it is the plant described in this work, especially as it quotes the

Grossularia sylvestris of Rumphius as a mere variety, and that without doubt. The author of the *Hortus Kewensis* has therefore done wisely in not quoting the *Grossularia domestica* for the *Atty-alu*, which I am persuaded is represented in the *Herbarium Amboinense* iii. *t*. 94. Although in the explanation of this plate it is said to represent the *Caprificus aspera latifolia*, this can by no means be reconciled with the description, which I think belongs to the *Ficus symphytifolia Encycl. Meth.* ii. 498 ; and I have no doubt that this plate (94.) represents the *Gohi glabra* of Rumphius, iii. 151. Further, I know that Dr. Roxburgh, when I returned from Ava, considered the *Atty-alu* as the same with his *Ficus glomerata*, although he does not quote it in the *Hortus Bengalensis*, deterred probably by Willdenow's authority.

The synonyma of this tree I therefore consider to be as follows:

Ficus glomerata, Hort. Beng. 66. Willd. Sp. Pl. iv. 1148. Encycl. Meth. Sup. ii. 656.

Ficus racemosa, *Hort. Kew.* v. 488.

Gohi glabra, *Herb. Amb.* iii. 151. *t*. 94. perperam ad Caprificum asperam latifoliam relata.

Udumbar *Sans.* Dumbar *Hind.* Jugya Dumar *Beng.* Sa-panngæh *Barm.*

Habitat ubique ad pagos Indiæ.

ITTY ALU, *p*. 45. *fig*. 26.

In the *Encyclopédie Méthodique* (ii. 493.) this is quoted for the *Ficus Benjamina* joined with the plant figured in Plukenet (*Phyt.* 243. *f*. 4.) ; and nothing in either work contradicts the opinion that both authors meant the same plant, although the figure of Plukenet, having no fruit, is rather doubtful. Willdenow, who had only seen a plant without flower, which he took to be the *Ficus Benjamina*, adds as synonymous the *Varinga parvifolia* of Rumphius

Rumphius (*Herb. Amb.* iii. 139. *t.* 90.), which I consider as a different plant: for Rumphius says "*fructus sessiles.*" Now the fruit of the *Itty alu* is on a stalk. In order, indeed, to obviate this difficulty, Willdenow calls the fruit *receptaculum subsessile*: and the figure in Rumphius, probably all that Willdenow ever consulted, has indeed this appearance in some parts: but this must be attributed to the carelessness of the draughtsman, for Rumphius was too blind to be able to check such errors, which were frequent. It remains therefore doubtful whether we are to consider the *Itty alu* or the *Varinga parvifolia* as the *Ficus Benjamina* of Willdenow; only the term *receptaculum subsessile*, used in his specific character, is not at all applicable to the former: and as the same term is continued in the *Hortus Kewensis* (v. 487.), some doubt is thrown on the plant meant in this valuable work, although it quotes only the *Itty alu*. I have not seen any tree that I could consider as the *Itty alu*; nor in the *Hortus Bengalensis* is any mention made of the *Ficus Benjamina*. I have, however, seen what I consider as both kinds of the *Varinga parvifolia* of Rumphius.

Arealu, *p.* 47. *fig.* 27.

This is the *Ficus religiosa* of the *Hortus Kewensis* (v. 484.), although in this work Willdenow (*Sp. Pl.* iv. 1134.) is quoted; and his plant is liable to some doubt, as besides the *Arealu* he also quotes the *Arbor conciliorum* of Rumphius. Willdenow indeed says that the figure given by Rumphius is bad; and no doubt, as it represents a plant totally different form the *Arealu*, so it ought. From this circumstance, however, we may infer that Willdenow really meant the *Arealu* to be his *Ficus religiosa*, as it was that of Linnæus, the proper synonyma being given in the *Flora Zeylanica* (372.): for it must be observed, that while Willdenow added the *Arbor conciliorum*, he omitted the *Arbor*

zeylanica religiosa of Burman (*Thes. Zeyl.* 29), from whence the specific name was borrowed. In the *Encyclopédie Méthodique* (ii. 493.) the *Arbor conciliorum* is considered as a variety of *Arealu*; but I have no doubt of their being entirely different species. Although the *Arealu* was particularly sacred among the heretical sect of Buddha, and is the *Bo-dhi bæn* chiefly venerated among its adherents in Ava; yet the veneration for it was too deeply seated among the populace to be eradicated; and among the orthodox of the day, it and the next tree hold nearly an equal place.

PERALU, *p.* 49. *fig.* 23.

This tree was described by Commeline under the name of *Ficus bengalensis folio subrotundo, fructu orbiculato*, which in the first edition of the *Species Plantarum* was united with an American tree figured by Plukenet (*Phyt. t.* 178. *f.* 1.) to form the *Ficus bengalensis*. Plukenet considered his plant as the same with the *Toiakela* of Rheede (*Hort. Mal.* iii. *t.* 64.), to which indeed it has as great a resemblance as the *Peralu*; but it is not likely that an American *Ficus* should be the same with either. His plant, however, still continues united with the *Peralu* in Willdenow; and, although not mentioned in the *Hortus Kewensis*, is perhaps the plant meant in that work, as Sloane's MSS. are quoted, and these probably relate to a plant of Jamaica.

When the *Peralu* was added to the *Ficus bengalensis* I cannot exactly say; but probably it was by Linnæus when he published the second edition of the *Species Plantarum*. In the *Encyclopédie Méthodique* (ii. 494.) the American plant of Plukenet, with its synonyma, was so far separated from the *Peralu*, as to be considered a remarkable variety; but in treating of the *Peralu*, the compiler of this useful work has been led into a great mistake in supposing it to be the *Pipala* of the Hindus; for although equally sacred with the tree so called, it is the *Vata* of the

the Sanscrita, written *Vadoe* by Rheede, and in the vulgar dialects corrupted to *Bar*, *Bat*, *Barga*, &c.; while the *Pippala* of the Sanscrita is the *Ficus religiosa*. From the vast size to which the *Peralu* grows; from its great celebrity all over India; from its being found near almost every village as a sacred plant, I have no doubt of its being the *Ficus indica* of the Greeks and Romans, and it is the Banyan tree of modern travellers. The other trees quoted by European botanists for this celebrated plant being rare, confined to a few woods, and altogether unnoticed and unknown to the bulk of the natives, I applaud Dr. Roxburgh for rejecting the barbarous specific *bengalensis*, and for restoring to the *Peralu* the ancient appellation of *Ficus indica* (*Hort. Beng.* 65).

Folia basi sinu parvo cordata vel retusa, apice obtusa, subtùs sæpe subtomentosa, semper pilosa, subquinquenervia: nervi enim plerumque quinque supra basin coalescunt, et præter eos ad basin sunt duo minuti. *Fici* globosi, pubescentes, magnitudine nucis moschatæ, calyce vel involucro triphyllo arcte cincti.

Bupariti, *p.* 51. *fig.* 29.

In the *Flora Zeylanica* (258.) Linnæus annexing numerous synonyma, and probably with tolerable accuracy, called this *Hibiscus foliis cordatis integerrimis*, which in the *Species Plantarum* became the *Hibiscus populneus;* and at the same time several changes were made in the synonyma, not for the better, as a doubt arises concerning the plant meant, by adding the *Novella litorea* (*Herb. Amb.* ii. 224. *t.* 74.), which I consider as a different species, from the form of the fruit, that opens in five valves, and from its growing only on the sea-shore. Both however continue united not only in Willdenow and the *Encyclopédie*, where the *Bupariti* continues a *Hibiscus*, but even in Gærtner (ii. 253), who

who removes this plant to a genus which he calls *Malvaviscus*. His description of the fruit is only applicable to that of the *Bupariti*, which must therefore be considered as his plant: and in the *Hortus Kewensis* (iv. 224.) the *Novella litorea* is properly omitted. See further under next head.

PARITI seu TALI PARITI, *p.* 53. *fig*. 30.

This stands nearly on the same footing with the *Bupariti*, want of care in quoting the synonyma having rendered doubtful the plant meant. Under the name *Ketmia zeylanica semper virens et florens, Tiliæ folio, flore luteo*, the elder Burman (*Thes. Zeyl.* 136) collected a number of synonyma, some of them such as the *Arbor solis* of Herman, belonging certainly to the *Bupariti*, while the American plant of Plumier in all probability belonged to another species. Linnæus in his *Flora Zeylanica* (259.) taking up the plant of Burman, with the American plant of Plumier, but rejecting all the other synonyma of the *Thesaurus Zeylanicus*, added them to the *Pariti*, and formed the species which he afterwards called *Hibiscus tiliaceus*. In the *Species Plantarum*, especially as it now stands in Willdenow's edition, the synonyma of the *Flora Zeylanica* have undergone many changes, and not all for the better. To the original American plant has been added another, yet both are acknowledged to want one of the chief specific characters. The *Novella* of Rumphius (*Herb. Amb.* ii. 218. *t.* 73.) is restored, although Rumphius himself considered his *Novella* as the *Bupariti* of Rheede, and his *Novella rubra* (*Herb. Amb.* ii. 223.) as the *Pariti*. With regard to the former he was certainly mistaken; but with regard to the latter he may be right. Burman, however, in his notes on the *Novella rubra*, considers it as a mere variety of *Novella*, which is probably the case; and the *Novella* has perhaps therefore been joined with propriety to the *Pariti*, with which however the description agrees better than the

the figure, Rumphius from the defect of sight being unable not only to judge concerning the care of his draughtsman, but even to know whether or not the figure intended was actually joined to the description.

These differences have perhaps induced the author of the *Hortus Kewensis* to quote neither Rheede nor Rumphius for the *Hibiscus tiliaceus;* and in the *Hortus Bengalensis* the *Novella* alone is quoted for this plant, while the *Pariti* is considered as a distinct species, called *Hibiscus tortuosus* by Dr. Roxburgh. Notwithstanding this, I may venture to say that the *Pariti* is the plant usually taken for the *Hibiscus tiliaceus* by botanists; and is evidently the one described in the *Encyclopédie Méthodique* (iii. 351.), although the figure referred to in the *Supplement* (iii. 216.) has as little resemblance as the *Novella* to the *Pariti*.

On the whole, Plukenet's synonyma (*Alm.* 16.) to the two plants of the *Hortus Malabaricus* are the best and most certain, and seem sufficient to lead us to a more full and exact list of the names which the *Bupariti* and *Pariti* bore in the older authors; only to the list for the latter we must add his own plant, described in the *Amaltheum* (vi. *t.* 355. *f.* 5.), although he does not seem to have recognised that he had previously mentioned it: but the figure is perfectly characteristic.

The author of the *Encyclopédie Méthodique* considers the figure of Plukenet (*t.* 178. *f.* 3.) as representing the *Pariti*, while Plukenet considered it as the *Ficus indica* of Pliny, Strabo, and other ancients. That he was mistaken in this, there can be no doubt; but, notwithstanding the form of the stipulæ strongly supports the *Encyclopédie*, I scarcely think that Plukenet could be so far mistaken.

CUDU PARITI, *p.* 55. *fig.* 31.

After having inquired much into the subject, and seen the cultivation of cotton carried on in a great extent of India, I am persuaded

persuaded that what in general are called species of *Gossypium* are mere varieties, differing vastly less than the varieties of cabbage (*Brassica oleracea*) reared in our gardens.

In the first place, the plant being annual, or growing to a small tree with a woody stem lasting for years, is a mere accidental circumstance, owing to the manner of treatment. In many places, the farmer considers it most for his advantage to sow the seed at a season when the seed, being brought rapidly forward, will produce plants which when two or three feet high will flower, and give a great return by producing numerous large well-filled capsules; immediately after which the exhausted plant is ploughed down for some crop of another kind, in order to restore the strength of the soil before another crop of cotton is taken: but the very same seed, if sown in a corner at another season, so as to come on less rapidly, will produce plants that last five or six years, that grow ten or twelve feet high, and that acquire a woody stem as thick as a man's leg. In some parts of the country an intermediate management is preferred. The seed is sown in distant rows, at a season when the plant will not flower until it reaches five or six feet high, and then becomes a strong shrub. The plant thus reared, with weeding and manure, lasts several years, and in each produces several crops; on which account, one manner of management is called *Baramasya Capas*, or twelve-month cotton. Some varieties of the plant are reckoned by the farmers more suitable than others for each variety of cultivation: but I am confident that every kind known in India might be reared in all the three ways, and thus become an annual, a shrub, or a tree.

In the next place, the number and form of the lobes in each leaf, the number of glands, and the various degrees of pubescence, on which botanists have attempted to found specific distinctions, in this genus are equally uncertain with the duration

of

of the roots, all being liable to great variation in plants produced from the same seed: the pubescence is however the best criterion of the three, and may serve at least to distinguish varieties.

The variety of appearance produced by cultivation on cotton did not altogether escape the notice of Rumphius, as may be seen (*Herb. Amb.* iv. 34.), where he describes the place of growth, and in the paragraph (36) beginning "*sacerdotes Egyptii.*" But when he described his *Gossypium latifolium* as a distinct species, which is merely the *Gossypium* reared into a tree by planting it in a corner, as I have mentioned, he seems to have neglected his former observations; yet he acknowledges that his *Gossypium latifolium* is the same with the *Kudu Pariti*, although no two varieties resemble each other less than the figures in the two authors. I am however convinced that he is here right; and so far as I saw in the province of Malabar, the only manner in which cotton was raised by the natives, was as the little trees reared in corners of gardens; it was not cultivated in fields for sale. Neither do I blame Linnæus for joining with these two arborescent varieties the *Gossypium herbaceum*, &c. of Plukenet (*Alm.* 172. *Phyt. t.* 188. *f.* 3.); although this, having been treated in the usual manner by sowing in a field, was a herb and not a tree.

If the *Gossypiums* are therefore to be divided into species, we must altogether neglect the divisions of modern botanists, derived chiefly from circumstances which I am persuaded are accidental, and return to the characters on which C. Bauhin and the botanists of other days chiefly relied; and I would propose three species, adding one to the two originally marked out by Linnæus, in reality, I am persuaded, on the characters of the older botanists, although Linnæus assumed others less satisfactory, the adopting their characters having been contrary to the rules which he thought necessary to propose.

 Species

Species 1.

Gossypium album, lanâ semineque albis.

Gossypium herbaceum. *Burm. Fl. Ind.* 150. (excluso synonymo *Rumphii.*)

Gossypium frutescens, annuum, folio trilobato Barbadense. *Pluk. Alm.* 172. *Phyt. t.* 188. *f.* 1. *et forte f.* 2. *et t.* 299. *f.* 1?

Colitur præsertìm in Egypto, Asiâ Minore, Syriâ, et Antillis.

Species 2.

Gossypium nigrum, lanâ albâ, semine nigricante.

Kudu Pariti. *Hort. Mal.* i. 55. *t.* 31.

Gossypium. *Herb. Amb.* iv. 33. *t.* 12.; et Gossypium latifolium. *Herb. Amb.* iv. 37. *t.* 13.

Gossypium herbaceum, &c. *Pluk. Alm.* 172. *Phyt. t.* 188. *f.* 3.

Gossypium arboreum. *Burm. Ind.* 150.

Colitur præsertìm in Indiâ vetere et aquosâ.

Species 3.

Gossypium croceum, lanâ croceâ.

Gossypium religiosum. *Hort. Beng.* 51. *Willd. Sp. Pl.* iii. 805.

Colitur in Indiâ Gangeticâ rariùs, in Chinâ plurimùm.

CHOVANNA MANDARU PRIMA, *p.* 57. *fig.* 32.

There can be no doubt that this is the *Bauhinia variegata* of authors, although the specific character given in Willdenow, and copied in the *Hortus Kewensis*, will little enable one to distinguish it, especially from the *candida*, the only difference between these plants being in the colour of the flower. I therefore consider them as mere accidental varieties. In the south of India the

the tree seldom is bare of leaves; but these being old when the tree flowers, they are then smooth. In the north, again, the leaves fall entirely before the flowers appear; and the new ones do not expand until the flowers have almost decayed, and then, being fresh, they are hairy below. On this account, I at first thought that the plant which I found in the north was different from that which I had formerly described in the south; but a more careful examination convinced me that there was no real difference. Both the white and red varieties are equally liable to this variation; and the same is the case in another difference that occurs in this species: some flowers, between the five fertile stamina, which each contains, have an equal number of minute barren filaments, alternating with those which are fertile: others want these appendages.

Mandaru seems to be the generic name for the *Bauhinias* in the languages of Kærulu, both sacred and vulgar, which in the greater number of plants do not agree. The names however used by the Brahmans of Malabar, according to Rheede, are generally the same, or nearly so, with those given in the Hindwi dialect, which are commonly mere corruptions from the Sanscrita, and are probably only those used by the Brahmans in common conversation, and not such as are used in their scientific works, which are almost all written in the last-mentioned dialect. The generic name for the *Bauhinias*, which I heard used in Carnata, was *Canchala*, evidently the same with *Canchana* the Hindwi, or *Canchun* the Bengalese name used in the north, and preserved in *Canschena Pou* of Rheede (*p.* 63.) as a specific name, *Pou* being the corruption for *Phula* (*Flos*, Flower), usual in Malabar. These circumstances being premised, I shall give a description of this species, comprehending both *B. variegata* and *B. alba*, such as appears to me entirely applicable to both.

Bauhinia variegata, calyce hinc ad fundum fisso, antheris fertilibus quinque.

Habitat in sepibus et ad pagos templaque Indiæ.

Arbuscula ramulis angulatis, pubescentibus. *Folia* alterna, subrotunda, sinu brevi utrinque bifida, nervis circiter undecim subtùs prominulis, et venis plurimis reticulata, suprà nuda, subtùs nunc ferè tomentosa, tunc nudiuscula, lobis utrinque obtusissimis. *Petiolus* brevis, pubescens, ad extremitatem utramque incrassatus, canaliculatus. *Stipulæ* deciduæ, duplicatæ; interior setacea. *Racemi* (vel capitula) brevissimi, 3—6-flori, ex axillis foliorum anni præteriti prodeuntes. *Pedicelli* conferti, squamulâ unâ vel alterâ minutâ ovatâ ad basin bracteati, paulò supra basin articulati, dein incrassati, angulati, subpubescentes. *Flores* magni, odorati, variegati petalo imo coloratiore. *Calyx* latere disrumpens, nervis quindecim striatus, apice quinquedentatus. *Petala* ad unum latus deflexa, unguiculata, lanceolato-ovata, acuta, intermedio latiore, ad basin conduplicato. *Filamenta* quinque (aliquando, sed non semper, alia quinque his alterna, minuta, sterilia), petalis opposita, adscendentia. *Antheræ* in filamentis longioribus quinque fertiles, versatiles, oblongæ. *Germen* pedicellatum, lanceolatum, pilosum. *Stylus* crassus, pilosus. *Stigma* obtusum. *Legumen* planum, marginatum, acuminatum, sæpiùs pentaspermum, inter semina angustatum, valvis inter semina conniventibus subquinqueloculare.

Varietas α, petalis quatuor roseis, purpureo-venosis, quinto purpureo fusco et flavo variegato.

Chovanna Mandaru prima. *Hort. Mal.* i. 57. *fig.* 32.

Bauhinia variegata. *Burm. Ind.* 94. *Willd. Sp. Pl.* ii. 510. *Encycl. Meth.* i. 389. *Hort. Kew.* iii. 23. *Hort. Beng.* 31.

Mandaru prima species. *Pluk. Alm.* 240.

Varietas

Varietas β petalis quatuor albidis, quinto intùs flavo et viridi variegato.

Bauhinia candida. *Willd. Sp. Pl.* ii. 510. *Hort. Kew.* iii. 23. *Hort. Beng.* 31.

CHOVANNA MANDARU SECUNDA, *p.* 59. *fig.* 33.

The *Bauhinia purpurea* of authors.

So far as I have heard, it is most usually called by the same names with the *B. variegata,* from which indeed it differs but little ; and it is equally entitled to the name *variegata*, as it has four purple petals, and the fifth finely variegated with white. Although the plant is well known, I shall note the differences between it and the description of the *B. variegata.*

Rami teretes. *Folia* apicem versus, lobis divergentibus, dilatata. *Petiolus* brevissimus. *Stipulæ* persistentes. *Pedicelli* apicem versus articulati. *Flores* parùm odorati. *Calyx* coriaceus, reflexus, quinque-carinatus, latere dehiscens, apice integer. *Petala* longiùs unguiculata, cuneata, venosa, undulata. *Filamenta* decem, quorum septem minima, setacea ; tria, summum nempe, et ab hoc secundum, utrinque longitudine fere corollæ, petalis opposita, et hæc versus incurva. *Antheræ* sagittatæ. *Legumen* longissimum, planum, lineare, valvis inter semina plura conniventibus.

VELUTTA MANDARU, *p.* 61. *fig.* 34.

It is generally agreed to call this the *Bauhinia acuminata,* although the lobes of the leaves are sometimes rather blunt, and never acuminated ; but they are not so much rounded as in the two last-mentioned plants. So far as I have heard, it is seldom distinguished from them by any appropriate name, being usually called *Canchun.*

Plukenet

Plukenet (*Alm.* 240.) says that he received a specimen from Jamaica. If actually of the same species, the plant had probably been brought from India; but nearly similar plants are often mistaken for each other, and these mistakes lead to an opinion of plants extending much further than in reality is the case. Burman (*Thes. Zeyl.* 45.) indeed quotes a plant of Sloane as synonymous with the *Velutta Mandaru*; but this was probably what Plukenet saw. These two authors, however, should be added to the synonyma in Willdenow; especially Burman, who gives a description. His synonyma respecting the *Thomæa arbor* must be received with caution; as this name is said to be derived from the flower having been stained red with this saint's blood: but there is no red about the flower of the *Velutta Mandaru*. The following are the most remarkable of its characters:

Folia sinu parvo cordata, apice biloba, lobis semiovatis sæpiùs acutiusculis. *Calyx* acutus, uno latere dehiscens, reflexus. *Petala* undique patentia, obtusa. *Filamenta* decem fertilia, basi coalita, alterna breviora, declinata. *Stamina* minimè diadelpha, ut voluit Linnæus.

Canschena pou, *p.* 63. *fig.* 35.

Since the time of Linnæus, botanists agree in calling this plant the *Bauhinia tomentosa*, a most improper appellation; as, when the foliage is fully grown, it is nearly destitute of hairiness. The description in Burman (*Thes. Zeyl.* 44.) shows clearly that this is the plant which he meant, and is good; but here also we must receive with doubt, or rather altogether reject, the synonyma referring to the *Arbor sancti Thomæ, in cujus floribus apparent sanguineæ striæ ab effuso sanguine D. Thomæ enatæ*, which, I agree with Plukenet, should be entirely referred to the *Bauhinia variegata*. Plukenet (*Alm.* 240.) considers his *Mandaru*

quarta

quarta species as the *Canschena pou*, and different from the *Mandaru Madaraspatense &c.* quoted by Willdenow (*Sp. Pl.* ii. 511.) as synonymous with the *Bauhinia tomentosa*.

The author of the *Encyclopédie* (i. 390.) is quite wrong in stating that the leaves have no sinus at the base, asany one may be convinced by looking at the figure of the *Canschena pou*. Indeed, in the Botanical garden at Calcutta I saw a species from America remarkably allied to this, and which only differed, so far as I could observe, in having *folia basi rotundata nec cordata*, and in wanting the large purplish mark near the bottom of the petals. The description in the *Encyclopédie* is also faulty in representing the flowers as standing in the axillæ of the leaves.

Folia utrinque biloba, subrotunda lobis obtusis. *Stipulæ* subulatæ marcescentes. *Pedunculus* primò quasi terminalis, sed prodeunte ramulo reverà oppositifolius, biflorus. *Flores* nutantes, flavi. *Calyx* ovatus, acutus, latere uno dehiscens, basi intùs tuberculis quinque munitus. *Petala* tuberculis calycis alterna, sessilia, subrotunda, subæqualia, marginum altero interiore obliquè convoluta. *Filamenta* decem, alternis longioribus, basi unita. *Antheræ* omnes fertiles. *Legumen* pedicellatum, lineare, acuminatum, planum, valvis inter semina ovalia 10. s. 12. transversa conniventibus. *Flos* marcescens rubescit ut in Hibisco populneo, Gossypiis pluribus, et aliis Malvaceis flore flavo.

MAROTTI, *p.* 65. *fig.* 36. *Enc. Meth.* iii. 713.

I cannot discover that this tree has been introduced into any of the modern botanical systems; but I have had an opportunity of observing the *Marotti* in the province of Malabar, and another species of the same genus in the hills of Tripura and Camrupa, bounding the province of Bengal on the east. I have great

great difficulty in referring this genus to any of the natural orders of Jussieu; sometimes thinking that it had a kind of resemblance to the *Berberides*: at others, that it came nearer the third division of the *Tiliaceæ*: and at others, to the third division of the *Aurantiæ*; but I am dissatisfied with all these arrangements. In the opinion of the authors of the *Encyclopédie*, this plant and the *Pangi* of Rumphius (*Herb. Amb.* ii. 182.) have an affinity, and in the general structure and the qualities of their fruits they have a general resemblance; but, if I understand the description of Rumphius, the seed of the *Pangi* has no perispermum. The *Marotti* has perhaps a still greater affinity with the *Hydnocarpus*, belonging, like it, to the *Polygamia dioecia* of Linnæus; but in place of having hermaphrodite and female trees, it has hermaphrodite and male. On account of the resemblance of *Marotti* to *Marattia*, I shall prefer the Bengalese name for the genus, and describe first the species found on the hills of Tripura.

CHILMORIA*.

Herm. *Calyx* pentaphyllus. *Petala* quinque; *squamæ* totidem petalis oppositæ. *Stamina* 5—15. *Germen* superum. *Stigma* peltatum, sessile. *Bacca* lignosa, unilocularis, pulpo farcta. *Semina* nidulantia, plura.

Masculini in diversâ arbore flores. *Calyx, petala, et stamina* ut in hermaphrodito. *Germen* nullum.

Species 1.

Chilmoria dodecandra, staminibus 10—15 indefinitis.
Chilmori Bengalensium in Tripura.
Habitat in montibus Indiæ ultragangeticæ.
Specimina misi ad D. J. Banks anno 1798.

Arbor elata ramis cinereis, lævibus. *Folia* alterna, lato-lanceo-

* GYNOCARDIA. *Roxb. Corom.* iii. *p.* 95.

lata,

lata, vel ovato-oblonga, integerrima, acuta, utrinque nitida, subcostata, venosa, pollices 8 longa, duo lata. *Petiolus* teres, canaliculatus, ad apicem incrassatus, brevissimus. *Stipulæ*, si ullæ, caducæ. *Pedunculus* interfoliaceus, sparsus, patens, petiolo brevior, uniflorus, teres, nudus. *Flores* herbacei, parvi. *Calyx* 4- seu 5-phyllus, deciduus, foliolis subrotundis, concavis, longitudine petalorum. *Petala* 5 seu 6 tenuia, subrotunda, concava, ad marginem villosa; *squamæ* totidem petalis oppositæ, et his magnitudine æquales, crassiores. *Filamenta* longitudine petalorum, receptaculo inserta, erecta, subulata, villosa. *Antheræ* cordatæ. *Germen* ovatum, tomentoso-sericeum. *Stigma* quadripartitum laciniis horizontalibus, obtusis. *Bacca* pedicellata absque calycis vel styli rudimento, depresso-subrotunda, epidermide tecta granuloso, cortice crasso ligneo glabro tecta, pulpo carnoso farcta, unilocularis. *Semina* plura, absque ordine in pulpo nidulantia, ovalia, compressa, latere rectiore crassiore. *Integumentum* triplex: exterius membranaceum, pulpo adherens; medium durum, fragile, crassiusculum, ad latus crassius politum, in circumferentia derasum, album; interius membranaceum, tenue. *Albumen* album, forma seminis carnosum. *Embryo* rectus transversus. *Cotyledones* contiguæ, subrotundæ, planæ, crassiusculæ, rectæ. *Radicula* recta crassa ad medium lateris seminis crassioris tendens.

Masculinos flores non vidi.

Seminibus oleum expressum ad morbos cutaneos reprimendos a Bengalensibus adhibetur.

Species 2.

Chilmoria pentandra, staminibus quinque.

Marotti. *Hort. Mal.* i. 65. *t.* 36.

Marathi

Marathi Malyalæ.

Surati in Haiva.

Habitat in sylvis Indiæ australis oceanum versus occidentalem.

Arbor præcedenti simillima. *Rami* angulati. *Folia* oblongo-ovata, acuminata, serrata, nuda, costata, crassa. *Petiolus* compressus, canaliculatus, subpubescens. *Stipulæ* caducæ, geminæ, laterales, e basi lata sensim angustatæ, erectæ, integerrimæ, tomentosæ. *Pedunculus* axillaris, solitarius, uniflorus, petiolo duplo longior, medium versus squamula una vel altera bracteatus.

Hermaphroditæ arboris calyx pentaphyllus foliolis inæqualibus, subrotundis. *Petala* quinque, hypogyna, tenerrima, ad margines pilosa, altero marginum interiore obliquo, sessilia, subrotunda: *squamæ* totidem, petalis multo minores. *Filamenta* quinque subulata, hypogyna, germine breviora, petalis alterna; *antheræ* parvæ, didymæ. *Germen* maximum, superum, ovatum. *Stigma* maximum, peltatum, sessile, quinquepartitum, laciniis bifidis, obtusis. *Bacca* lignosa, unilocularis, farcta, tomentosa, subrotunda, coronata acumine papilliformi, ad apicem obtuso, stellato. *Semina* angulato-ovata, acuminata, funiculis umbilicalibus e basi seminis crassiore enatis ad parietes fructus exteriores affixa. *Perispermum* oleosum. *Embryo* rectus. *Cotyledones* planæ. *Radicula* funiculum versus descendens.

Masculini floris descriptionem habui e Doctore Andrea Berry. Huic pedunculus communis axillaris, solitarius, 5- seu 6-florus. *Calyx* et *corolla* ut in hermaphrodito. *Filamenta* quinque, convergentia, subulata, ad basin pilosa. *Antheræ* erectæ, obtusæ, emarginatæ. *Pistillum* nullum.

Oleum lucernis aptum, et psoram adversus usurpatum, e seminibus exprimitur.

Obs. Ægle et Feronia fructum habent nonnihil similem.

Caniram,

CANIRAM, *p.* 67. *fig.* 37.

The *Strychnos Nux Vomica* of Authors.

NILICAMARAM, *p.* 69. *fig.* 38.

The name should have been written *Nilica maram:* the latter word signifying tree, and the former word being in the possessive case. *Nili* is the proper name, and *Neli* is the name by which I found the tree called all over the south of India, while we have other species, of what the natives consider the same genus, in the *Kirga Neli* and *Neli Poli.* It is true that Zanoni uses the word *Nellika* as in the nominative case; but it should have been *Nelli kai,* that is, the fruit *Nelli, Kai* in the dialects of southern India signifying fruit. The name *Anvali,* used by the Brahmans of Malabar, according to Rheede's orthography, seems to be a corruption of the Sanscrita *Amalaki,* in the Hindwi corrupted into *Amlaki,* and in the Bengalese into *Amla.* From the Hindwi name is derived the *Emblica* of Europeans, which by Linnæus was made a species of *Phyllanthus.* As this genus has for some time stood, it may be defined:

Plantæ inter Euphorbias inter tropicas nascentes, foliis minoribus, structura florum et fructus haud bene cognita.

Croton is a genus differing merely in having larger leaves.

As European botanists have been acquiring more knowledge of the structure of individuals, they have been separating from both *Phyllanthus* and *Croton* various species to form new genera; but having been directed by no general views, and having not been aware how few of the species correspond to the generic characters of *Croton* and *Phyllanthus* given by Linnæus, these new genera have been formed with little judgement, and generally upon some one trifling variation in the fructification, which will be found to include a few species in no manner remarkably

 like

like each other, and to exclude several plants that have a strong resemblance to those possessed of the mark on which the generic character is founded. Accordingly, scarcely any two botanists are agreed about the new genera separated from the *Phyllanthus* and *Croton* ; and some, not without strong reasons, seem inclined not only to replace them where they stood, and even to join several genera that Linnæus himself had separated upon grounds perhaps no better than what have induced later botanists to encroach on his arrangement.

The name *Phyllanthus*, given to the *Nilicamaram* by Linnæus, was founded on the supposition that the leaves were merely pinnæ of a compound leaf, and the flowers, being in the axils of these pinnæ, of course were supported by the rachis of the leaf. In some of the species, this supposition of Linnæus is certainly confirmed by the appearance of stipulæ at the junction of the small branches that have leaves, with the larger that are bare: but many species want this mark; nor do I know of any common character drawn from the fructification, by which the two kinds could be distinguished. Many botanists talk of the species provided with such stipulæ as having pinnated leaves, and of the species wanting these stipulæ as having simple leaves: but they do so with little strictness; and, on the authority of Jussieu, I doubt much of these small branches which support the leaves being proper common petioles, as, when the leaves change, these little branches do not fall off, but produce new branches, each of which acquires supports like stipulæ.

Willdenow and the author of *Hortus Kewensis* have removed the *Phyllanthus* from the order of *Triandria*, where Linnæus placed it, to the *Monadelphia*, to which no doubt some species belong; but they do not confine themselves to such alone, the *Phyllanthus Emblica* belonging to the *Monoecia Syngenesia*. Further, as its fruit is what I would call a drupa, and not a capsule,

sule, I think that Gærtner has done right in describing it as a separate genus, under the name *Emblica.* In the Supplement to the *Encyclopédie* (Art. *Anvali*) it is erroneously stated to differ from the *Phyllanthus* in having two seeds in each cell of the fruit: such is the case in every *Phyllanthus* that I know, although we must allow, on the authority of Jussieu (*Gen. Pl.* 425.), that some species of *Phyllanthus* have only three seeds in each fruit.

The name Shrubby *Phyllanthus* given in the *Hortus Kewensis* (v. 335.) to this plant is peculiarly unfortunate, there being in the genus a great many shrubs, with this only tree; for in reality it is nearly in size like the Holly, growing, when undisturbed, twenty or thirty feet high; but when young assuming the appearance of a large bush, and in that state producing in abundance both flower and fruit. The latter having been accurately described by Gærtner, I shall only describe the flower, and mention some circumstances by which the plant may be distinguished from another species which I have seen, and which I shall describe at length, adding some account of a tree with a similar fruit, but of which I have never seen the flower.

Species 1.

Emblica officinalis. Gærtn. ii. 122. t. 108. f. 2.

Phyllanthus Emblica. *Willd. Sp. Pl.* iv. 587. *Encycl. Meth.* v. 301; *Supp.* i. 403. *Hort. Kew.* v. 335. *Linn. Fl. Zeyl.* 333.

Nilacamaram. *Hort, Mal.* i. 69. *t.* 38.

Mirobalanus Embilica. *Herb. Amb.* vii. 1. *t.* 1.

Acacia zeylanica floribus luteis, &c. *Burm. Thes. Zeyl.* v.; ubi omnia erroris plena.

Habitat ubique in India, siccioribus gaudens, sed humida non abnuens.

Arbor erecta ramulis foliosis fasciculatis: *rami* basin versus sparsi, apicem

apicem versus trifarii. *Folia* obtusa, avenia. *Pedunculi* axillares sæpiùs tres, in alis foliorum inferiorum masculinos flores, in alis superiorum fœmininos gerentes.

Masculus flos sexpartitus, coloratus, apetalus, inferus, laciniis subrotundis, concavis, conniventibus. *Filamentum* nullum. *Antheræ* tres, biloculares, coalitæ in corpus globosum, umbilicatum, calyce tectum.

Fœmininus flos apetalus, coloratus, hexaphyllus, marcescens, foliolis oblongis, recurvis. *Filamenta* nonnulla, absque antheris, lacera germen circumdant. *Germen* ovatum, magnum, superum. *Stylus* nullus. *Stigmata* tria, bifida, patentia, laciniis bifurcis, obtusis.

Species 2.

Emblica pisiformis, caule arbusculoso, scandente, floribus fœmininis medium ramuli occupantibus, foliis linearibus.

Shiray in Carnata.

Habitat in sylvis durioribus Indiæ australis Mediterraneæ.

Arbuscula scandens, *Emblicæ officinali* juniori simillima. *Rami* teretes, fusci, ad folia denticulato-nodosi. *Ramuli* foliosi absque stipulis sæpiùs gemini, bifarii, patentes, angulati, persistentes. *Folia* alterna, minuta, in singulis ramulis plurima, bifaria, approximata, pinnas folii compositi mentientia, subsessilia, linearia, ad basin obliquè emarginata, acuta, integerrima, glabra, venosa, nervo marginali cincta. *Stipulæ* propriæ, geminæ, laterales, marcescentes. *Pedunculi* masculini ex axillis foliorum ferè omnium terni, penduli, folio dimidio breviores, filiformes, nudi. Fœminini duo vel tres prope ramuli medium solitarii, crassiores, breviores. *Flores* albi, fœmininis majoribus. *Fructus* magnitudine pisi.

♂. *Calycis* foliola sex oblonga, obtusa, patula, duplice serie posita.

sita. *Glandulæ* sex per paria approximatæ, subrotundæ in fundo calycis. *Filamentum* unicum, centrale, teres, erectum, longitudine calycis. *Antheræ* tres, biloculares, longitudinaliter dehiscentes, in corpus unicum coalitæ.

♀. *Calyx* inferus, marcescens, hexaphyllus. *Germen* trilobum, infrà margine integerrimo brevissimo mellifero cinctum. *Stylus* longitudine calycis, ad basin ferè trifidus, laciniis erectis. *Stigmata* magna, biloba, horizontalia. *Capsula* baccata, depresso-triloba, lobis sulcatis. *Cortex* tenuis. *Putamen* corneum, triloculare, loculis medio longitudinaliter dehiscentibus. *Semina* in singulis loculis bina, hemisphærica, *receptaculi* centrali affixa.

Species 3.

Emblica Palasis, foliis ovalibus.

Arbor indica, pyrifolia, fructu nucis moschatæ simili, tricapsularis. Cattakai Malabarorum. *Pluk. Mant.* 23. *pl.* 2. *t.* 336.

Palasi Magadhæ.

Wodagu Cheræ.

Habitat in montosis Angæ, Magadhæ, Cheræ.

Arbor magna, materie firma. *Ramuli* bifarii, teretes, nudi. *Folia* alterna, bifaria, ovalia, sed ad petiolum sæpiùs acutiuscula, apice nonnunquam retusa, integerrima, venis valde reticulata, sed vix costata, nuda, subtùs glauca. *Petiolus* brevissimus. *Stipulæ* in fructifera planta obsoletæ. Florentem non vidi. *Fructus* piscicidi, in ramulo brevi noduloso sæpiùs solitarii, aliquando gemini, magnitudine nucis moschatæ, absque calyce subumbilicati, drupaceo-capsulares, sulcis sex vel rariùs octo exarati. *Cortex* succulentus, sublactescens, maturitate deciduus. *Cocculus* osseus, sulcis sex vel octo polaribus exaratus, suturis tribus seu quatuor dehiscens,

hiscens, tri- vel quadri-locularis, parietibus et septis duris crassis. *Semina*, abortu forte, solitaria, meniscoidea, subrotunda, ex apice loculi interiore apicem versus suspensa. *Integumentum* duplex: exterius molle, glutinosum; interius politum. *Albumen* tenue. *Embryo* rectus, non spiralis. *Cotyledones* planæ, crassæ, laterum altero ad umbilicum verso. *Radicula* ad extremitatem seminis pendulam posita.

ODALLAM, *p.* 71. *fig.* 39.

Rumphius, in describing his *Arbor lactaria* (*Herb. Amb.* ii. 243. *t.* 81.), fell into the mistake of quoting the *Odallam* as synonymous, in which he was followed by Burman (*Thes. Zeyl.* 251.), who for his *Manghas lactescens*, &c. quotes both with many synonyma belonging partly to one, partly to the other, and partly perhaps to neither; for neither his drawing nor description can be well reconciled with either, having sessile blunt leaves, while the fruit is much smaller than that of the *Odallam*, and of a very different shape from that of the *Arbor lactaria*. Although, therefore, Burman no doubt quotes many authorities referring partly to the *Arbor lactaria*, and partly to the *Odallam*, I doubt much of either being the plant figured and described by him: yet this plant of Burman is the true original of the *Cerbera Manghas* of Linnæus, who in the *Flora Zeylanica* (106.) quotes the *Odallam* with doubt, and does not notice the *Arbor lactaria*. By the time, however, that the younger Burman wrote (*Flor. Ind.* 66.), all the three plants were united, and continued to be so until Gærtner separated the *Odallam*, calling it *Cerbera Odallam*, with a barbarous indeclinable termination, and withal mis-spelt, as Rheede uses *Odallam*: but a typographical error in the *Flora Zeylanica* having produced *Odollam*, it continued to be used by almost all botanists, until corrected in the *Hortus Kewensis*, in which work it is quoted, without synonyma, for the *Cerbera Manghas.*

Manghas. I am on the whole persuaded that, as the *Cerbera Manghas* stands in Willdenow, it contains three species.

1. *Cerbera Manghas*, foliis obtusis, sessilibus.
   Manghas lactescens foliis Nerii crassis, venosis, Jasmini flore, fructu Persicæ simili, venenato. *Burm. Thes. Zeyl.* 151. *t.* 70. *f.* 1. omissis synonymorum pluribus.
   Cerbera foliorum nervis transversalibus. *Linn. Fl. Zeyl.* 106.
   Manghas sylvestris, lactescens, venenata, Jasmini flore et odore. *Pluk. Alm.* 241.
   Cerbera fruticosa. *Hort. Beng.* 19?
2. *Cerbera Odallam*, foliis acutis, petiolatis, drupis dispermibus. *Gærtn.* ii. 193. *t.* 124. *f.* 1. *Hort. Beng.* 19.
   Manghas orientalis angustifolia, ossiculo cordiformi, binos nucleos continente. *Pluk. Alm.* 241.
   Odallam. *Hort. Mal.* i. 71. *t.* 39.
   Cerbera Manghas. *Hort. Kew.* ii. 65.
3. *Cerbera lactaria*, foliis acutis, petiolatis, drupis monospermibus.
   Cerbera Manghas. *Gærtn.* ii. 192. *t.* 123. *et* 124. *f.* 1.
   Arbor lactaria. *Herb. Amb.* ii. 240. *t.* 81.

As the name *Manghas* has thus been taken up so variously, and has nothing to recommend it, we might perhaps drop it altogether, and adopt another, such as the *fruticosa* of Roxburgh, provided his plant is the same with that of Burman.

Mail anschi, *p.* 73. *fig.* 40.

The elder Burman (*Thes. Zeyl.* 142.), in mentioning the *Ligustrum indicum* seu *Alcanna* of Herman, without quoting the *Mail-anschi*, as he ought to have done, proposes as a query, if the *Poutaletsie* of Rheede (iv. 117.) be not the same. Linnæus in

in the *Flora Zeylanica* (135.) adopted this opinion without doubt; and, although he mangled the name into *Poutaletsce*, he added all the synonyma by which the *Cyprus* of the ancients had been known to the older botanists, and formed his *Lawsonia ramis inermibus.* He however perceived that the *Mail anschi* was no doubt of the same genus with the *Cyprus* of the ancients, and possessed of the same qualities; but he considered it as of a distinct species, which he called *Lawsonia ramis spinosis.* He no doubt was perfectly right in so far as related to the *Mail anschi* and *Poutaletsie* being different species; for they are not even of the same natural order nor Linnæan class; and the latter, besides, has none of the qualities of the *Cyprus* Jussieu, therefore, in his *Genera Plantarum* (367, 222.), rejected this plant from the genus *Lawsonia*; yet still the compilers of the *Encyclopédie* (iii. 107.) considered it as only a different species, which they called *Lawsonia purpurea.* Since, however (*Supp.* iii. 39.), they have removed it from that genus, owing to the discovery of M. Desfontaines, that it had one petal and four stamina, which indeed might have long before been known from Jussieu, or even from Rheede. The compilers, however, justly considered the circumstance of the branches of the *Mail anschi* terminating sometimes in a spinous point, as not sufficient to distinguish it as a species from the *Cyprus* of the ancients growing in Egypt and Arabia, where these spines are said not to occur. The whole synonyma of the *Lawsonia spinosa* and *inermis*, except the *Poutaletsie*, were therefore united under the denomination of *Lawsonia alba*, only the plant with spines was considered as a variety. I am however persuaded that even this is going too far; for in the same hedge I have observed plants in all degrees, some having a great many branches ending in thorns, some only a few, and some none at all. Although, therefore, both Willdenow and the *Hortus Kewensis* continue the distinction, I am persuaded

that

that it is erroneous, unless the plant of Egypt has some other mark, besides the want of thorns, to distinguish it from the *Mail anschi*. Indeed, the genus *Lawsonia* properly consists of only one species, the *Acronychia* appearing to be a different genus; and as the names *spinosa* and *inermis* will thus be laid aside, we should have *Cyprus* or *Cypros* (Pliny uses both) for a specific appellation, the name by which the plant has been known to the learned in Europe since the time of Dioscorides.

Cumbulu, *p.* 75. *fig.* 41.

Linnæus (*Sp. Pl.*) and Burman (*Fl. Ind.* 131.) took this to be the *Bignonia Catalpa*, a plant which is not found spontaneous in India; but this has been abandoned. Gærtner (i. 269.) first pointed out that it was a real species of *Gmelina*, but gave it no name, nor did he describe it. Neither Willdenow, however, nor the *Encyclopédie Méthodique* mention it as a *Gmelina*, the latter (ii. 224.) comparing it with the *Clerodendrum*, the *Tittius* of Rumphius, and the *Cyrtandra* of Forster. It is a very common tree in India, the *Gumbhari* or *Gumhar* of the natives, and in the *Hortus Bengalensis* (46.) is called *Gmelina arborea*. The *Bignonia Catalpa* of Burman is no doubt the same plant.

Drupa magnitudine pruni minoris, oblique-subrotunda, laterum uno convexiore, basi tecta calyce parvo subpentagono, apice retusa, glabra, pulpa crassa ad putamen adhærente succulenta: succus flavo tingens. *Nux* dura, crassa, obovata, lævis, e basi antro magno obliquo ad apicem ferè pertusa, bilocularis. *Receptaculum* carnosum, antrum nucis implens. *Semina* solitaria.

Nux secundum Rheedium rugosa. In germine paulo aucto, sunt rudimenta seminum quatuor circa corpusculum centrale. *Seminum* duobus abortientibus corpusculum centrale fit antrum nucis cum receptaculo.

Canschi, *p.* 76. *fig.* 42.

Linnæus quoted this for his *Trevia nudiflora ;* and it continues in *Monoecia tetrandria* in Burman (*Fl. Ind.* 198.) without any synonyma, exept that of Commelin quoting the *Canschi* by the Latin name given by Syen. The description, however, which Linnæus gave of his *Trevia* (*flores hermaphroditi germine infero, stylo unico*) was so totally different from the *Canschi*, that I am persuaded he had some other plant in view, and quoted the *Canschi* by mistake. In the *Encyclopédie* (viii. 39.) the *Trevia* was described as in Linnæus. Soon after Willdenow, not recognising the plant from such a description, published it as a new genus, which he called *Rottlera ;* but, when he published the fourth volume of his *Species Plantarum*, he had discovered that his *Rottlera* and the *Canschi* were the same. He therefore called it *Trewia nudiflora*, at any rate changing a little the former orthography, and introducing a letter unknown in the Latin tongue. In thus changing his name *Rottlera* I think he was wrong, because in all probability Linnæus had quoted the *Canschi* by mistake, and described a *Trevia* not now known : and further, because the *Rottlera tinctoria* of Dr. Roxburgh does not, I am persuaded, differ from the *Canschi* so much that it ought to be considered as belonging to a different genus. It is true that Willdenow places the one in the order *Icosandria*, and the other in *Polyandria ;* but that is a paper difference only, and not distinguishable in nature. I have therefore no objection to the *Mallotus* of Loureiro being joined with the *Canschi*, although Willdenow should not have done so, because the *Mallotus* has not the *capsula tetracocca, tetrasperma, quadrilocularis*, which he ascribes to the *Canschi* as its diagnostic character ; but I know that this character is quite fallacious. I have however a strong objection to the *Tetragastris ossea* of Gærtner (ii. 130.) being made the same

species

species with the *Cánschi*, the fruit of which is not like that of the *Tetragastris* "*inferne in quatuor lobos pulvinatos, distantes, quasi totidem ventres, divisa.*" Whether or not the *Tetragastris* be a *Trewia* or *Rottlera*, cannot be decided until the flower is known.

The *Canschi* is a very common tree in India, and varies very much in its appearance, so that at times I have thought that several different species, nearly indeed resembling each other, might be traced; but on a careful examination, I am persuaded that the marks of distinction on which I relied are fallacious. In Bengal, the natives usually give names totally different to the male and female trees; and in many cases the foliage is so like that of the *Cumbalu* last noticed, that they are often confounded under the same common name, *Gumhar*. I have also heard the *Canschi* called *Pitali* in Matsya, *Berkal* and *Bankedli* in Camrupa, and *Banphul* in Magadha.

In the following description all the variations that I have noticed are mentioned.

Arbor excelsa ramis teretibus, nudis: *ramulis* novis tomentosis. *Folia* opposita, altero minore, nunc deltoideo-ovata, tunc subcordata (utraque forma in figura Rheedii conspicitur), integerrima, acuminata, quinquenervia, venosissima; juniora utrinque pilis stellatis pubescentia, adulta glabra; in India boreali ante florescentiam decidua. *Petiolus* brevis, depressiusculus, suprà sulco exaratus, primò tomentosus, dein glaber. *Stipulæ* geminæ, laterales, setaceæ, caducæ. *Glandula* plana utrinque prope apicem petioli in pagina folii superiore.

In masculina arbore *Racemi* sæpiùs ex axillis foliorum anni præteriti, rariùs in surculis novis infrafoliacei, solitarii, penduli, elongati. *Pedunculus* compressiusculus, tomentosus. *Pedicelli* terni longitudine florum, squama communi solitaria,

solitaria, decidua bracteati. *Flores* herbacei, tomentosi. *Calyx* reflexus, 2—4-phyllus foliolis ovatis, acutis, concavis. *Filamenta* plurima longitudine calycis receptaculo carnoso insidentia. *Antheræ* orbiculatæ, utrinque emarginatæ, ad margines dehiscentes.

In calyce numerus naturalis quaternus videtur, nunc uno tunc altero foliolo cum alio conjuncto.

In arbore fœmininâ pedunculus axillaris, solitarius, erectus, pulverulentus, petiolo longior, nunc uniflorus, tunc elongatus in racemum pauciflorum, folio brevior. *Flores* pulvere albido tomentosi, pedicello crasso brevi insidentes. *Bractea* squamiformis solitaria, decidua, ad basin floris. *Calyx* inferus, striatus, apice quadridentatus, deciduus, germini arctè adhærens, eoque brevior, nunc ad unum latus disrumpens, tunc in foliola 2, 3, vel 4, divisus. *Germen* subrotundum. *Stylus* brevissimus, teres. *Stigmata* 2—5, subulata, longa, intùs barbata.

Pomum subrotundum, pedunculum versus acutiusculum, obsoletè tetragonum, magnitudine juglandis. *Cortex* crassus, carnosus. *Loculamenta* totidem cum stylis, dissepimentis tenuibus discreta, monosperma. *Semina* arillo pulposo angulato loculum implente tecta, subrotunda, nigra, polita, sublentiformia, nuciculosa. *Testa* ossea, crassiuscula.

In germine etiam loculamenta sunt monosperma.

PALEGA-PAJANELI, *p.* 77. *fig.* 43.

Quoted erroneously in the letter-press as figure 44.

This is the *Bignonia indica* of authors ; and the synonyma, if we remove the *Pajaneli* of Rheede, seem to be accurately given in the *Encyclopédie Méthodique* (i. 423.), composing a species with two varieties differing in the size of the leaflets ; and a little in their form ; but both, it is to be presumed, having bipinnated

leaves.

leaves. It is not uncommon in every part of India, chiefly in hedges or near houses, where it is planted as an ornament, or rather singularity; for it is a lurid fœtid plant, of an uncouth appearance.

PAJANELI, *p.* 79. *fig.* 44.

Quoted erroneously in the letter-press as figure 45; an error which several botanists have copied, without I suspect having read the description, or looked at the number on the plate.

The *Pajaneli* does not seem to have been noticed by European botanists, until it was quoted in the *Encyclopédie* as a variety of the *Bignonia indica*, and conjoined with plants that very possibly are such; but this, having only simply pinnated leaves, is totally different, although of nearly the same size, and equally lurid and uncouth. The variety of the *Encyclopédie* Willdenow made a different species, which he called *Bignonia longifolia*, which however he defines *foliis bipinnatis;* and if he saw any such plant, it must be quite different from the *Pajaneli*. He does not however say that he ever saw the plant, and he has perhaps borrowed his account entirely from Rheede; and this he must have done without reading the description, taking it for granted that the leaves, like those of the *Palega Pajaneli*, were doubly pinnated, and drawing his character entirely from the figure.

Loureiro quotes the *Pajaneli* for the *Bignonia indica α*, which is therefore the same with the *Bignonia longifolia* of Willdenow. Perhaps, however, Loureiro really described a plant with doubly pinnated leaves, and therefore it may only be his quotation that is erroneous. Persoon, again, quotes *Hort. Mal.* i. *t.* 45., probably meaning this same plant for his *Spathodea indica*, which is therefore *Bignonia longifolia* of Willdenow, and not the *Bignonia indica*, as Persoon suspected.

As

As I found this plant in the province of Canara, and presented a drawing to Sir J. E. Smith, I shall annex a description.

Bignonia Paianelia, foliis impari-pinnatis, multijugis; foliolis integerrimis semicordatis, calyce ventricoso, bilabiato.
Pajaneli. *Hort. Mal.* i. 79. *t.* 44.
Bignonia longifolia. *Willd. Sp. Pl.* iii. 306?
Cuntra (planta claudicans) Taulavæ.
Habitat in sylvis Indiæ australis, oceanum versus occidentalem.

Arbor fœtida, facie *B. indicæ*, trunco brevi, nodoso, simplici. *Rami* pauci, stricti, subulati, ordine cicatricum ovalium duplici spiraliter notati. *Folia* apices versus ramorum approximata, opposita, cum impari pinnata. *Pinnæ* circiter duodecim parium, latere inferiore angustato, abbreviato, semicordatæ, integerrimæ, acuminatæ, glabræ, costatæ, venosissimæ, pedicellatæ. *Petiolus* communis pinnâ brevior, estipulaceus, suprà carinatus, subtùs rotundatus. *Thyrsus* terminalis, erectus, tres vel quatuor pedes longus, teres, compositus e pedunculis oppositis, brachiatis, compressis, farinosis, bis bifidis, subseptemfloris. *Bracteæ* squamiformes, caducæ, parvæ, ad divisiones pedunculi geminæ. *Flores* maximi, extùs lurido-purpurei, intùs albidi. *Calyx* pulvere ferrugineo aspersus, ante floris maturitatem pulpo glutinoso albido farctus. *Calyx* campanulatus, quinquangularis, bilabiatus: *labium* superius longius, obtusum, bilobum, inferius trilobum, obtusum. *Corolla*, tubo angustato, campanulata, calyce duplo longior, obliqua, lobis quinque crispis, ad marginem lanatis incisa. *Filamenta* quinque, quorum quatuor inferiora e basi tubi crassa, declinata, compressa, dydynama, antherifera: quintum minimum, filiforme, sterile. *Antherarum* per paria conniventium, corolla breviorum loculi

culi oblongi, basi tantum uniti. *Germen* receptaculo carnoso, convexo, maximo, cinctum, anceps. *Stylus* compressus, longitudine staminum. *Stigma* e lamellis duabus lanceolatis, acutis, conniventibus conflatum. Fructum non vidi.

PALA, *p.* 81. *fig.* 45.

By a mistake in the letter-press quoted as figure 46.

Linnæus and Burman (*Flor. Ind.* 69.) joined the *Lignum scholare* of Rumphius (*Herb. Amb.* ii. 246.) with the *Curutu Pala*, next described in this work, and with a plant of Breynius formed the *Tabernæmontana scholaris*, being right as to the genus respecting the *Curutu Pala*, but wrong as to the *Lignum scholare*, which is an *Echites*. There is reason, however, from the specific name to believe that the *Lignum scholare* was in reality the plant which they meant to describe. The error soon became evident, and, in place of the *Curutu Pala*, the *Pala* was joined with the *Lignum scholare* to form the *Echites scholaris* (*Encycl. Meth.* ii. 341.), the plant of Breynius being left out, although I have no doubt of its being the *Pala*. As, however, the leaves of the *Lignum scholare* are sharp-pointed and have prominent veins, and as those of the *Pala* differ in both respects, Willdenow (*Sp. Pl.* i. 1241.) seems with propriety to have rejected it as synonymous with the *Lignum scholare*, which is the only authority for the *Echites scholaris*, thus leaving the *Pala* unoccupied. I think that this is a common tree in Bengal, is there called *Chhatin*, and is what Dr. Roxburgh (*Hort. Beng.* 20.) called the *Echites scholaris*; but the circumstances above mentioned lead me to doubt the accuracy of this opinion, although there can be no doubt of the *Pala* and *Lignum scholare* being very nearly allied species. As I may have misunderstood Dr. Roxburgh's meaning, who in the *Hortus Bengalensis* quotes neither Rheede nor Rumphius, I shall describe the *Pala*.

 Echites?

Echites? Pala, foliis verticillatis, obtusis; folliculis filiformibus, longissimis; paniculis verticillatis.

Pala. *Hort. Mal.* i. 81. *t.* 45.

Nerium lactescens malabaricum maximum pentaphyllum polyanthemum, flore minimo racemoso odorato viridi-albicante, siliquis propendentibus longissimis *Breynii. Prodr.* ii. *p.*86.

Habitat in pinguioribus Indiæ locis.

Arbor inter grandiores: *ramuli* subumbellati, teretes, punctis elevatis aspersi, lactescentes. *Folia* ad internodia verticillata, quina, sena vel septena, oblongo-cuneata, obtusa, integerrima, glabra, suprà nitida, venis transversis non prominulis striata. *Petiolus* brevissimus, anceps, glaber. *Stipulæ* solitariæ, erectæ, obtusæ, brevissimæ, persistentes, intrafoliaceæ. *Paniculæ* terminales, nunc solitariæ, tunc duæ tres vel etiam quatuor, foliis breviores, patentes; *ramis* duplice serie verticillatis, teretibus, pilosis, horizontalibus, nunc bifidis vel trifidis, tunc sæpiùs simplicissimis. *Flores* capitati, sessiles, ex albido viridescentes, odore gravi melleo scatentes, magnitudine mediocres. *Bracteæ* vagæ, squamiformes, parvæ. *Calyx* pilosus, ultra medium quinquefidus, obtusus, inferus. *Corollæ* hypocrateriformis utrinque pilosæ tubus calyce multo longior, medio angustatus, annulo setoso coronatus. *Limbi* subadnati, æstivatione imbricati, tubo brevioris, quinquepartiti laciniæ obovatæ, laterum interiore gibbosiore tenuiore, obliquæ. *Filamenta* quinque brevissima ex apice tubi partis angustioris. *Antheræ* conniventes, ovatæ, adnatæ, acuminatæ, inclusæ. *Germen* unicum, ovatum, pilosissimum. *Stylus* teres, longitudine staminum. *Stigma* capitatum, cylindraceum, mucrone duplice coronatum. *Folliculi* duo foliis multoties longiores, penduli, filiformes. *Semina* comosa.

Curutu

CURUTU PALA, *p.* 83. *fig.* 46.

Quoted by mistake in the letter-press as 47.

In giving an account of the last plant, I have mentioned the mistake of Burman in uniting this, which is a *Tabernæmontana*, with the *Lignum scholare*, an *Echites*. When this error was rectified, the *Curutu Pala* was called *Tabernæmontana alternifolia* (*Willd. Sp. Pl.* i. 1246.), nothing being known of it except from the *Hortus Malabaricus*, where indeed some of the leaves are represented in the figure as alternate, although others are placed opposite; a very great error, not uncommon in this work, as may be seen in the *Canschi*, *fig.* 42. and *Caniram*, *fig.* 37. of this volume.

Mr. Brown (*Prodr. Nov. Hol.* i. 468.) considers the *Curutu Pala* as very nearly allied to his *Tabernæmontana orientalis*, and, except the form of the bractes (*subulata*), I see nothing in his specific character to distinguish the plants. The *Curutu Pala*, however, is so nearly allied to the single variety of the *Tabernæmontana coronaria*, that I shall only endeavour to point out in what they differ; as I shall give a full account of the *T. coronaria* in treating of the *Nandi Ervatam* (*Hort. Mal.* ii. *t.* 54. and 55.), only premising that, except from the smell, it would be very difficult to say whether the full-flowered *T. coronaria* belonged to the *Nandi Ervatam minor* or to the *Curutu Pala*: and still I am in doubt concerning this circumstance, the natives of Camrupa considering the *Curutu Pala* as the wild *T. coronaria*, while those of Malabar seem to be of the contrary opinion.

Although very unwilling to change names, I consider the *alternifolia* so objectionable, that it cannot possibly be retained, and therefore I readily adopt the name given to this plant by Dr. Roxburgh. There is reason however to suspect that the *Nerium divaricatum* of Willdenow, with all its synonyma, should

 rather

rather be referred to this species than to the *Nerium coronarium*, as has been done in the *Hortus Kewensis*.

1. *Tabernæmontana crispa*. Hort. Beng. 20.
   T. orientalis. *Brown Prodr. Nov. Hol.* i. 468?
   T. alternifolia. *Willd. Sp. Pl.* i. 1246.
   Nerium divaricatum. *Willd. Sp. Pl.* i. 1236?
   Curutu Pala. *Hort. Mal.* i. 83. *t.* 46.
   Apocynum indicum sylvestre inodorum siliquosum, seminibus papposis, floribus albis amplis. *Burm. Zeyl.* 25.
   Cat (spontanea) Tagar Bengalensium in Camrupa.
   Habitat in dumetis Camrupæ spontanea: colitur in horto botanico ad Calcuttam e China missa.

Folia quam in *T. coronaria* longiora, undulatiora, acuminatiora; flores pauciores: sed neque in caule, vel foliis, vel fulcris aliquem characterem inveni determinatum, unde differentiam specificam haurire possem. *Flores* e viridescente-albi fauce flavo, odore debili. *Calyx* obtusus. *Tubus corollæ* infra medium dilatatus. *Limbi* laciniarum margo exterior rotundata, vel quasi truncata, neque in processum acutum producta. *Antheræ* infra tubi medium positæ.

2. *Tabernæmontana coronaria, flore simplice*. Hort. Beng. 20. Encycl. Meth. Sup. v. 275.
   Nerium divaricatum. *Willd. Sp. Pl.* i. 1236?
   Nerium foliis lanceolato-ovatis, ramis divaricatis. *Linn. Fl. Zeyl.* 109? excluso synonymo *Burmanni*.
   Jasminum malabaricum aurantiæ foliis, flore pentapetaloide, niveo, fragrantissimo, Nandi Ervatam minor. *Hort. Mal.* ii. *t.* 55. *Pluk. Alm.* 196.
   Banka Bengalensium in Camrupa.
   Colitur in hortis Indiæ rariùs.

Flores

Flores e flavescente-albidi, valde odorati. *Calyx* acutus. *Corollæ* tubus ad basin et supra medium dilatatus. *Laciniarum* limbi margo exterior angulata. *Antheræ* supra tubi medium positæ.

3. *Tabernæmontana coronaria, flore pleno.* Hort. Beng. 20. *excluso synonymo* Hort. Mal. ii. t. 55.

Nerium coronarium. *Willd. Sp. Pl.* i. 1256. excluso synonymo supra dicto.

Jasminum indicum, odoratum, aurantiæ foliis, album, flore multiplice roseo, e Maderaspatana, forte Nandi Ervatam major. *Hort. Mal.* ii. *t.* 54. *Pluk. Alm.* 197. excluso synonymo *Hernand.*

Jasminum zeylanicum, folio oblongo, flore albo pleno, odoratissimo. *Burm. Thes. Zeyl.* 129. *t.* 59.

Flos Manilhanus. *Herb. Amb.* iv. *t.* 39.

Tagar Indorum.

Colitur ubique in hortis Indiæ.

Flores albi, odoratissimi, ita pleni et distorti, ut notæ specificæ, quibus præcedentes distinguuntur, obsoletæ fiunt.

Codaga Pala, *p.* 85. *fig.* 47.

By an error in the letter-press quoted as 48.

In the *Flora Zeylanica* (107.) Linnæus joined this with the *Nerium indicum*, &c. of Burman (*Thes. Zeyl.* 167. *t.* 77.), who however does not say that his plant is the same with the *Codaga Pala*; but only says that it was reckoned the same with a plant of Herman, which Burman considered as his *Nerium indicum*. In fact, the two plants are quite different, the *Codaga Pala* being an *Echites*, while the *Nerium indicum* of Burman I have no doubt is the plant which Dr. Roxburgh (*Hort. Beng.* 19.) called *Nerium tinctorium*.

The

The younger Burman (*Fl. Ind.* 68.), in imitation of Linnæus in the *Species Plantarum*, gave the name of *Nerium antidysentericum* to the plant of the *Flora Zeylanica*, changing the quotation of a plant from Ray for one from Plukenet (*Alm.* 35.), which is of a very doubtful nature, Plukenet merely proposing as a query, if his plant may not be the *Codaga Pala*. But it is impossible to say whether the younger Burman had in view the plant described by his father, or the *Codaga Pala*.

Willdenow (*Sp. Pl.* i. 1236.), leaving out the doubtful plant of Plukenet, continues the *Nerium antidysentericum* as he found it, with the synonyma of the elder Burman and Rheede.

In the *Encyclopédie* (iii. 455.) the synonyma are little improved by restoring that of Ray; but the circumstance mentioned, of the folliculi adhering together at the upper ends, would seem to imply, that the author meant the plant of Burman, although the medical qualities mentioned are borrowed from Rheede.

Finally, in the *Hortus Kewensis* (ii. 68.) we have the *Nerium antidysentericum* of Willdenow quoted for the *Wrightia antidysenterica* of Brown, which, from the generic character given by that excellent botanist (*Prod. Nov. Hol.* i. 467.), is certainly neither the *Nerium indicum* of Burman, nor the *Codaga Pala;* but I have no doubt is of the same genus with the *Nelem Pala* of the *Hortus Malabaricus* (ix. *t.* 3 and 4.); but to this I shall again return.

Dr. Roxburgh in his MSS., as they stood in 1796, described a plant almost every part of which was strongly but agreeably bitter, and which in almost every respect agreed so well with the *Codaga Pala*, that he then had no doubt of its being the same, and he called it *Echites antidysenterica*, as it belonged to this genus. On my return from Ava, I showed him specimens and a drawing of what I called the *Echites pubescens*, which seemed to have equal claims to be considered as the *Codaga Pala*, the figure of which in some parts looks as if hairy; and it is this circumstance

circumstance almost alone that distinguishes my plant from that of Dr. Roxburgh. It must however be observed, that the latter is much more bitter, and therefore is more likely to possess powerful medical qualities. Those however ascribed to the *Codaga Pala* rest on slender foundation, the people employed by the worthy Dutch Governor to report the medical qualities of the plants he described, appearing to have been endowed with a very moderate share of judgement.

Reserving for another occasion what more I have to say concerning the *Wrightia antidysenterica*, I shall now give an account of the two plants quoted by Linnæus for the *Nerium antidysentericum*, hoping thus to render the account of the *Codaga Pala* more clear than it has hitherto been.

Since I returned from Ava (1796) I have had frequent opportunities of seeing the *Echites pubescens* in various parts of India, and I have also met with the smooth-leaved plant described by Dr. Roxburgh, who in the *Hortus Bengalensis* does not quote the *Codaga Pala* for his *Echites antidysenterica*. Whether or not he thought that the *Echites pubescens* had a better claim, I cannot say: for my own part, I continue doubtful. The leaves in Rheede's description are neither said to be smooth nor hairy; and the terms in which he speaks of the bitterness (*saporis amari, et minus pungentis*) do not imply any great intensity; while the *Echites pubescens* is bitter, somewhat with the flavour of Broom, although not nearly so strong in taste as the *E. antidysenterica*; and these are almost the only points in which the plants differ. Leaving the *Echites antidysenterica* to the account of Dr. Roxburgh, I shall describe the *Echites pubescens*, of which the specimens and drawings sent from Ava are probably in the collection of Sir Joseph Banks, and a copy of the drawing is in the Company's Library, while I have given to this collection specimens of both plants.

Echites

Echites pubescens. *Mss. Buchanani in Musæo Banksiano.*
Codaga Pala. *Hort. Mal.* i. 85.*t.* 49?
Habitat ubique in Indiæ montibus aridioribus.

Arbor statura Punicæ, erecta, ramis teretibus fuscis, ramulis compressis pubescentibus lactescentibus subsulcatis. *Folia* petiolata, minora tres, majora novem pollices longa, plerumque oblonga, aliquando ovata, nunc basi integra, sæpiùs obtusa, aliquando acuta, tunc sed rariùs cordata, apice acuminata, margine acuto cartilagineo integerrima, suprà pilis brevissimis erectis, subtùs pilis brevibus mollibus pubescentia, costata, venosa, rugosa. *Petiolus* brevissimus, lateri angustiori rami insertus, canaliculatus, pubescens, estipulaceus. *Pedunculi* axillares, dichotomi, multiflori, folio breviores, teretes, pubescentes. *Bracteæ* ad divisiones pedunculi subulatæ, breves, deciduæ. *Flores* fastigiati, albi, odoratissimi, magnitudine Jasmini. *Calyx* erectus, quinquepartitus, pubescens, laciniis linearibus acutis. *Corolla* hypocrateriformis. *Tubus* paulo supra basin incrassatus, pentagonus, dein subulatus, calyce longior, et extrà et intrà pilosus. *Faux* ferè clausus, nudus. *Limbus* quinquepartitus, laciniis lanceolatis, obliquis. *Filamenta* brevissima, basi tubi cylindrico inserta. *Antheræ* parvæ, subulatæ, in partem tubi tumidam inclusæ. *Germina* duo absque corpusculis lateralibus. *Stylus* clavatus, bisulcus, longitudine staminum. *Stigma* acutum. *Folliculi* duo glabri, teretes, sed ad semina subtorulosi, penduli, divaricati, uno pedali, altero sæpiùs breviore. *Semina* comosa.

Now to return to the *Nerium indicum, siliquis angustis erectis, longis, geminis* of Burman (*Thes. Zeyl.* 167. *t.* 77.), which has been confounded with the *Codaga Pala*. It may be readily distinguished by the singular manner in which the points of the folli-
culi

culi are united. I have already said, that from this circumstance I am certain that it is the plant which Dr. Roxburgh called the *Nerium tinctorium*, although he does not quote the figure of Burman, and although it differs as much from the generic character of *Nerium*, as given by Mr. Robert Brown, as the *Wrightia* does: for in place of having five scales on the mouth of the tube of the corolla, like the *Nerium*, or ten scales, like the *Wrightia*, it has numerous filaments, some undivided and others branched. Not having at hand the valuable treatise on *Asclepiadeæ* by this excellent botanist, I do not know what he calls this genus. It is however to these filaments that we must refer the following words in Burman's description: "*Flores staminibus multis in conum acutum collectis ornati.*" The anthers form the cone terminating the bunch of many filaments, which crown and ornament the flower in a very singular manner; and these are more conspicuous in the living plant than in the drawing, probably taken from a dried specimen.

In spring (1811) I found a tree named in the Hindwi dialect *Dud' Koraia*, which I took for the *Nerium tinctorium*, as it possessed this character in its flowers: but, towards the end of the same year, the people who had formerly accompanied me brought a branch with fruit, which they considered as the *Dud' Koraia;* and it seemed to me also to agree perfectly with the account of the leaves, &c. which I took on the former occasion. The fruit at once showed me that it was different from the *Nerium tinctorium;* but I may have been mistaken in supposing that the fruit and flower belonged to the same species: and the name *Dud' Koraia* is given also to other plants, and especially to the *Echites pubescens*, which I have just described. I shall however give a description of this *Nerium* like the *indicum* of Burman, in order to distinguish it clearly from that plant. *Dud'* prefixed to the name *Koraia* signifies milky.

Nerium Coræa, corona floris filamentosa, ramosa; folliculis apice disjunctis.

Habitat in montibus Magadhæ saxosis.

Frutex magna, vel *arbuscula* statura Punicæ, ramulis oppositis lactescentibus, compressiusculis, subtomentosis. *Folia* opposita, subovata, integerrima, costata, venis minutè reticulata, suprà pilis rectis subglutinosa, subtùs pilis albis substellatis tomentosa, inferiora obtusa, superiora acuminata. *Petiolus* brevissimus, estipulaceus. *Pedunculus* communis terminalis, brevissimus, trifidus, flore ad ramum tertium opposito: *rami* glutinoso-pilosi, teretes, dichotomi axillis floriferis. *Flores* albidi magnitudine florum aurantii, suaveolentes, pedicellati. *Bracteæ* lineares, patulæ, persistentes, ad singulas cymæ divisiones, numero ramos æquantes. *Calyx* pubescens, quinquepartitus, laciniis ovalibus, obtusis, margine undulatis, inæqualibus. *Tubus corollæ* teres, longitudine calycis. *Fauces* coronatæ filamentis pluribus setaceis, limbo dimidio brevioribus, nonnullis ad medium multifidis. *Limbus* tubo triplo longior, extrà pubescens, plano-patulus, laciniis oblongis, obtusis, obliquis, margine interiore tenuiore. *Filamenta* quinque brevissima ex apice tubi. *Antheræ* filamentis continuæ, subulatæ, conniventes, intùs pilosæ, loculis lateralibus. *Germen* biloculare. *Stylus* clavatus longitudine ferè antherarum. *Stigma* turbinatum, antheris conniventibus tectum, et his ferè adhærens. *Folliculi* teretes, glabri, sesquipedales, apice discreti, patentes. *Semina* comosa.

Pili in pagina foliorum inferiore in *Nerio tinctorio* simplices.

TINDA PARUA, *p.* 87. *fig.* 48.

By mistake quoted in the letter-press as 49.

This is the *Morus indica* of Linnæus, who, when he established the species in the *Flora Zeylanica* (337.), quoted this almost alone, the plant of Commelin being the same, and the quotation from Burman (*Thes. Zeyl.* 47.) throwing no light on the subject. Linnæus, however, was quite mistaken in supposing the figure in Rheede to represent the female tree; it is no doubt the male, with the flowers collected in little capitula, and the stamina expanding: but with great propriety Rheede adds a separate figure of the fruit. It seems to have been these male capitula, taken for the female flower, that induced Linnæus to consider this as a *Morus;* but the description of the fruit ought to have convinced him that the plant could not belong to that genus.

In the younger Burman (*Fl. Ind.* 198.) we find an addition made to the synonyma by introducing a real *Morus indica* described by Rumphius (*Herb. Amb.* vii. 9. *t.* 5.), but totally different from the *Tinda Parua*. The *Morus indica* continues in the same state in Willdenow (*Sp. Pl.* iv. 378.) and in the *Encyclopédie Méthodique* (iv. 378.), only the latter quotes Loureiro, who certainly meant the *Morus indica* of Rumphius, as he mentions silk-worms being fed on its leaves, and the fruit being eaten; to neither of which purposes was the *Tinda Parua* ever applied. There is even reason to suppose that Willdenow meant the *Morus* of Rumphius, and not the *Tinda Parua*, as he says that the plant, of which he had seen specimens, resembled the *Morus alba*. As however the *Morus indica* of Rumphius comprehends two species, both equally entitled to the specific appellation, and as the *Tinda Parua* is not a *Morus*, the name should be altogether abandoned.

Dr. Kœnig, under the name *Trophis aspera*, described one of

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the most common Indian trees. Why he called it a *Trophis* I cannot say, except that its bark, like that of the *Trophis americana*, is used for cleaning the teeth; for its fructification differs much from that of the *Trophis americana* as described by Linnæus. Dr. Roxburgh from Kœnig himself knew the tree which was called *Trophis aspera*, and was satisfied that it was the *Tinda Parua*, as indeed must be evident to every person who compares the tree with Kœnig's account published by Retzius. Whether or not Kœnig was aware of the circumstance, I know not; but many botanists continue to describe the *Trophis aspera* as if it were a different plant from the *Morus indica;* nor does Willdenow seem to doubt of its being a *Trophis*, although this is by no means supported by his description taken from Kœnig, and which, so far as it goes, is correct. I do not know on what authority the fruit of the *Trophis aspera* is stated in the *Encyclopédie* (viii. 125.) to have two cells; but, were this correct, the compiler might naturally enough have thought that it should have been joined with the *Streblus* of Loureiro, which Vahl, perhaps the author of this mistake, has been pleased to call *Achymus*, a genus not even of the same natural order with the *Trophis*, nor with even the *Tinda Parua*; for this also is no doubt one of the *Urticæ*, as the following account will show.

Arbor rigida, cortice cinereo lævi, ramulis intertextis, hispidis, parciùs lactescentibus. *Folia* alterna, subbifaria, rigida, subsessilia, elliptica, basi obtusiora, emarginata, apice acuminata, hispida, costata, venis reticulata, serraturis obtusis incisa. *Stipulæ* geminæ, laterales, caducæ.

Masculina arbor. *Pedunculus* brevis, geminatus vel fasciculatus, axillaris, ebracteatus, terminatus involucro penta- vel hexa-phyllo, flores nonnullos (5—8) in capitulum subrotundum colligente. *Calyx* quadripartitus, reflexus. *Filamenta* quatuor,

quatuor, subulata, laciniis calycinis opposita, hisque longiora, antheris adultis, elasticè reflexa.

Fœminina arbor. *Flores* axillares, minimi, sæpe sessiles, gemini, sæpiùs tamen subfasciculati, subpedicellati, bracteis suffulti duabus minutis, persistentibus, calyci arctè adhærentibus. *Calyx* quadripartitus, persistens, laciniis concavis, convolutis, germen arctè incumbentibus. *Germen* superum, oblongum. *Stylus* bipartitus, exsertus, laciniis flexuosis. *Stigmata* simplicia. *Bacca* nutans, lutea, subrotundo-lentiformis, bracteâ calyceque persistentibus maximè acutis involuta, succulenta, unilocularis. *Semen* solitarium, magnum, subglobosum. *Perispermum* viride, formâ seminis, hinc rimâ exaratum. *Embryo* intra rimam perispermi nidulans, incurvus, teres.

Ana Parua, *p.* 88.

In this part there is neither description nor drawing. In the general index we are referred to part vii. p. 83.; and in the index to the seventh part we are referred for the *Ana Parua* to the 44th table and 83d page; but the *Acatsia-Vatli* or *Cuscuta* is described there. Plukenet seems however to have received some further account of this plant than is contained here; for he says as follows: "*Ana-Para* (misprinted for *Ana-Parua*) *Hort. Mal.* *p.* 1. *f.* 88. *Poona Cai* (*Poonæ* fructus) Malabarorum. Insigne ad venerem incentativum. *Mant.* 13." And again he says, "*Poona Cai* Malabarorum magnum est ad venerem incentativum. *Mant.* 143." This is referred to the third line of page 247 of the *Almagestum*, which treats of the *Pai-Paroea* (*Hort. Mal.* v. *t.* 46.), to which accordingly the Brahmans gave the same name, *Bendarli*, that is given to the *Ana-Parua*; and Syen has the following note at the end: "Prima *Peroeæ* species in parte prima descripta est nomine *Tindæ Paruæ*." We may therefore, I think, fairly

fairly conclude that the *Ana-Parua* is the same with the *Pai Paroea*, *Parua* and *Paræa* being different orthographies for the same name, and *Pai* and *Cai* being the specific names given on the coast of Malabar, called properly Kærulu, while *Cai* is that used in the Tamul language of Coromandel, vulgarly called Malabars by Europeans.

Cavalam, *p.* 89. *fig.* 49.

By mistake quoted in the letter-press as 50.

This plate and the accompanying letter-press are wanting in my copy. I shall only therefore say, that the figure represents the *Sterculia Balanghas*, *Encycl. Meth. Sup.* i. 614. sub *Bencaro.*

Ambalam, *p.* 91. *fig.* 50.

The letter-press in my copy is wanting, but the figure remains, and I know the plant well. Plukenet (*Mant.* 156.) proposed with doubt the supposition that this might be the same with his *Prunus americanus*, &c. (*Alm.* 307.), which is the *Chrysobalanus Icaco*, and accordingly the *Ambalam* has been quoted as such. Rumphius (*Herb. Amb.* i. 162.) considered it the same with his *Condondum*; and Burman, in his explanation, added to the latter many of the synonyma which Plukenet had given to the *Ambalam*, and with more reason; for the stone of the *Condondum*, according to Rumphius, is " magnum fibrosum nucleum instar glebæ intricatæ, et confectæ ex plumulis filamentosis, quorum quædam eminent instar spinularum—in hujus autem centro seu cavitate parvus continetur nucleus prunellorum silvestrium formam referens." This account by no means resembles the fruit of the *Ambalam*, which contains a hard nut divided into five cells.

In the *Encyclopédie* (iii. 697.) the *Condondum* is considered as the *Mangifera pinnata*, which Willdenow (*Sp. Pl.* i. 1151.) says is

is a species of *Spondias*. I therefore suppose that Willdenow took the *Ambalam* to be the *Mangifera pinnata*, for it is really a *Spondias*, which in the *Encyclopédie* (iv. 261.) is called *Spondias amara*, not I presume from any bitter quality, but from the name *Amra*, by which it is known in the Hindwi and Bengalese dialects, derived from the *Amarataca* of the Sanscrita.

Athough the figure is not quoted in the *Hortus Bengalensis*, I know perfectly that the *Ambalam* is the *Spondias mangifera* of that Catalogue (34.), and probably of Willdenow (ii. 751.), so called, I suppose, on the belief that it was the *Mangifera pinnata* of Linnæus. But this is extremely doubtful, the *Condondum* of Rumphius having a much better claim, from the structure of the fruit, to be considered a *Mangifera:* and in the account of the *Mangifera pinnata* in the *Encyclopédie*, derived from plants in the Isle of France, it is stated that the nut of its fruit is analogous to that of the common Mango; that is to say, is fibrous as in the *Condondum* and *Chrysobalanus*. Specimens of both the *Ambalam* and *Mangifera pinnata* from the Isle of France, the latter given to me by Dr. Wallich, are in the collection which I presented to the East India Company's Library. I have little doubt, therefore, that while we call the *Ambalam*, *Spondias amara*, quoting the *Spondias mangifera* of Roxburgh and Willdenow as synonyms, we may restore the *Mangifera pinnata* of the younger Linnæus to the system, quoting for it the *Condondum*. Its being polygamous is no proof of its not being a *Mangifera*, that being the case with the common Mango. That the *Mangifera indica* is not a *Spondias*, is clear from its having only one stylus.

Cat Ambalam, *p.* 93.

Figure 50 is also quoted for this in the letter-press; but it belongs to the preceding plant.

The description of the *Cat Ambalam* is so imperfect, that I can judge nothing of what it may be; only the term *Cat* prefixed to the name implies that it grows wild.

Agaty, *p.* 95. *fig.* 51.

By mistake quoted in the letter-press as 53.

This very common and highly ornamental tree, by Syen, in his note, was considered, most justly, as of the same genus with the *Sesban* of Egypt, which, as he observes, is found also in Ceylon, and is indeed common all over India. The *Sesban* was then considered a *Galega,* a better classification than was afterwards adopted (*Burman Ind.* 169, 170.), when both *Agaty* and *Sesban* were united with *Aeschynomene*, the distinguishing character of which is to have jointed legumes. The former was then called *A. grandiflora,* and the latter *A. Sesban.* This classification being no longer tenable, Willdenow removed the two kindred plants to the genus *Coronilla* from its character (*lomentum articulatum vexillum vix alis longius*), equally ill suited to comprehend them; as the *Agaty* has *legumen bivalve, vexillum alis brevius.* On this account probably Dr. Roxburgh allowed these plants to remain in the genus *Aeschynomene* (*Hort. Beng.* 56.), the alteration of Willdenow having been not for the better. M. Poiret in the *Encyclopédie* (vii. 127.) restored matters to the opinion of Syen, making however *Sesban* a genus, and giving the *Agaty* as the *Sesban grandiflorus.* In the *Hortus Kewensis* (iv. 331.) the same idea is judiciously adopted; but the names are rendered more suitable to Latin declination, and thus we have the *Sesbana grandiflora.*

CADA PILAVA, *p.* 97. *fig.* 52.

Besides the *Pada vara* (*Hort. Mal.* vii. *t.* 27.), which seems to be the *Morinda umbellata* of Linnæus, and to which I shall have occasion to return in this Commentary, we have in India two distinct classes of *Morindas*, all of which that I have seen, one excepted, answer to the specific character given of the *Morinda citrifolia*, arboreà, pedunculis solitariis : but the one which I excepted agrees so well in every respect but size with one of the classes, that it should be included ; and the specific characters of Linnæus being thus unable to distinguish them from his *Morinda citrifolia*, I shall enter into some detail concerning the whole.

The first division of *Morindas* that I have seen in India, are thus to be distinguished : *pedunculis terminalibus geminis, vel lateralibus solitariis oppositifoliis.*

Species 1.

Morinda citrifolia, caule arbusculoso erecto, pedunculis nudis brevissimis, stipulis obtusis, baccis unitis.

Morinda citrifolia. *Burm. Ind.* 58. *Willd. Sp. Pl.* i. 992. *Encycl. Meth.* iv. 314.

Morinda caule arboreo, pedunculis solitariis. *Linn. Fl. Zeyl.* 82.

Cada Pilava. *Hort. Mal.* i. 97. *t.* 52.

Bancudus latifolia. *Herb. Amb.* iii. 158. *t.* 99.

Arbor conifera Macandou Javanensium Bontii. *Pluk. Amalth.* 27.

Colitur ubique ad pagos Indiæ ob fructum.

Arbuscula (vel *Frutex*) magna ramulis compressiusculis, ad petiolos incrassatis, glabris. *Folia* opposita, approximata, elliptica, integerrima, apice acuta, basi acuminata, nitida, venosa, plus quam sexpollices longa. *Petiolus* teres, folio utrinque decurrente alatus, brevissimus, glaber. *Stipulæ* interfolia-

ceæ, deciduæ, oblongæ, obtusæ, erectæ, integerrimæ, breves. *Capitulum* floriferum, foliorum altero deficiente, oppositifolium, magnitudine ovi columbini, obtusum, nudum. *Calyx:* margo integer. *Corolla* alba limbo quinquepartito, laciniarum duabus remotioribus. *Fructus* ovatus, glaber, obtusus, magnitudine ovi anserini, e baccis arctè adhærentibus, apice quinquangularibus, areolatis, flavescens, edulis.

Species 2.

Morinda bracteata, caule arboreo, pedunculo ad apicem foliato elongato, baccis unitis. *Hort. Beng.* 15.
Bancudus angustifolia. *Herb. Amb.* iii. 157. *t.* 98.
Habitat in insulis Andamanicis.

Arbor viginti vel triginta pedes alta, ramulis angulatis subtetragonis. *Folia* opposita, lanceolata, integerrima, acuminata, glabra, venosa, undulata. *Petiolus* brevissimus. *Stipulæ* interfoliaceæ. *Pedunculus* foliorum altero deficiente oppositifolius, teres, erectus, capitulo multo longior, foliolo uno vel altero ad apicem bracteatus. *Capitulum* floriferum subrotundum magnitudine nucis moschatæ. *Calyx:* margo integer. *Corolla* alba laciniis duabus erectioribus. *Bacca* tetrasperma.

While in the Andaman islands, Mr. Stockoe, one of the officers stationed there, showed me a piece of Gamboge which had been found in the island; and a Malay was procured, who undertook to show me the tree from whence it had been taken. This *Morinda* was what he showed, calling it *Bancudu*, evidently the name used by Rumphius for the *Morinda*. Indeed this differs only from his *Bancudus angustifolius* in having one or two bracts, or small leaves rather, at the top of the pedunculus, in place of having a bract between every flower. The Malay was probably deceiving

deceiving me. On my return from Ava specimens were sent home, and are probably in the Banksian Museum.

Species 3.

Morinda squarrosa, caule fruticoso erecto, pedunculo nudo, fructu baccis hinc inde prominentibus nodoso.

Daruya Huridra Bengalensium.

Habitat in dumetis Camprupæ.

Frutex magnus, vel *Arbuscula* spontanea. *Folia* glabra, undulata, in ramis elliptica, in ramulis lanceolata, sed apicem versus latiora. *Capitula* florifera ovata, obtusa, ebracteata, magnitudine nucis moschatæ. *Pedunculus* petiolo duplo longior, nudus. *Baccæ*, vel potius *Drupæ*, livido-albidæ, pulpo albo diaphano tectæ, non conferruminatæ ut in duabus præcedentibus, sed distinctæ, nonnullis etiam abortientibus sæpiùs remotæ, unde fructus squarrosus. *Nuciculæ* in singulis baccis binæ, biloculares. *Semina* solitaria.

Species 4.

Morinda persicæfolia, caule suffruticoso diffuso, capitulis subsessilibus, stipulis acutis.

Habitat in campis et sylvis regni Peguensis et in Ava.

Suffrutex laxus, tetragonus, obtusangulus, glaber. *Ramuli* ad apicem caulis pauci, patentissimi. *Folia* opposita, elliptica, integerrima, sæpiùs acuta, aliquando acuminata, nuda. *Petiolus* brevissimus, folio decurrente marginatus. *Stipulæ* interfoliaceæ, subulatæ, petiolo longiores. *Capitulum* subsessile, laterale, foliorum unico deficiente oppositifolium, vel terminale, aliquando foliolo bracteatum, magnitudine pisi, floribus decem circiter compositum. *Calyx* quinquefidus. *Corolla* incurva, capitulo multo longior.

The second division of the *Morindas* which I have seen may be distinguished as follows: *pedunculis terminalibus geminis, vel lateralibus solitariis axillaribus.*

Species 5.

Morinda Mudia, foliis tomentosis oppositis.
Mudi Carnatice.
Habitat in sylvis Carnatæ.

Arbuscula ramis quadrangularibus, tomentosis, ad petiolos annulatis. *Folia* opposita, e cordata ad ellipticam formam variantia, integerrima, acuminata, costata, venosissima, utrinque tomentosa. *Petiolus* semiteres, brevissimus, submarginatus, tomentosus. *Stipulæ* interfoliaceæ, persistentes, erectæ, sæpiùs bifidæ, acutæ, integerrimæ, tomentosæ, petiolo breviores. *Pedunculus* axillaris, alternus, solitarius, erectus, petiolo brevior, ebracteatus, apice gerit capitulum baccis quinque seu sex, abortu forte monospermis onustum. Flores non vidi.

Species 6.

Morinda Chachuca, foliis subtùs pubescentibus, inferioribus ternis.
Cha chuka (*oculi seni*) Bengalensium in Matsia.
Habitat in Matsiæ et Magadhæ sylvis.
Cortex radicis tinctorius, an igitur sylvestris varietas *Morindæ* Ach vel Al dictæ, quæ in Malva præcipue colitur ob radices tinctorias, cui quoque pedunculi axillares? (*Hunter apud Acta Calcutt.* iv. 35).

Arbuscula ramis hexagonis; *ramulis* tetragonis, nudis. *Folia* elliptica, vel lanceolato-ovata, in ramis majoribus terna, in ramulis opposita, integerrima, acuta, suprà scabra, subtùs pubescentia, ad axillas costarum barbata, venosa. *Stipulæ* inter-

interfoliaceæ, semicirculares, sæpiùs bilobæ, mediocres, persistentes. *Petiolus* brevissimus. *Pedunculus* axillaris, solitarius, petiolo paulo longior, nudus. *Capitulum* sæpiùs sexflorum, unde nomen.

Species 7.

Morinda nodosa, foliis oppositis ternis quaternisve glabris, fructu nodoso.

Bankather Hindice.

Habitat in sylvis Magadhæ.

Arbuscula sequenti simillima. *Folia* in ramis terna vel quaterna, in ramulis opposita, glabra. *Flores* pubescentes. *Fructus* magnitudine ovi, germinibus variis abortientibus nodosus, et sæpissimè morsu insectorum omnino abortivus, rimosus. *Baccæ* drupaceæ cortice crasso viridi succoso, quadriloculares. *Testæ* quatuor, planiusculæ, rugosæ.

Species 8.

Morinda Coreia, foliis oppositis glabris.

Koreya Hindice in Mithila.

Habitat in sylvis Mithilæ.

Arbor mediocris ramulis compressis, quadrisulcis, obtusangulis, glabris. *Folia* opposita, approximata, elliptica, sed ultra medium latiora, utrinque acuta, undulata, integerrima, glabra, costata, venosa. *Petiolus* brevissimus, marginatus. *Stipulæ* interfoliaceæ marcescentes. *Pedunculus* nunc axillaris, solitarius, tunc sæpiùs terminalis, solitarius vel geminus, angulatus, glaber, petiolo multoties longior, nunc nudus, tunc prope apicem folio uno vel gemino comosus, unde capitulum quasi terminale, subsessile. *Capitulum* subrotundum, densè imbricatum floribus albis circiter decem vel duodecim. *Flores* magni, odorati, substantia corollæ crassa,

coriacea.

coriacea. *Calyx:* margo superus integerrimus. *Corolla* infundibuliformis: *tubus* crassus longitudine limbi, extrà viridis, rudis; *limbus* quinquepartitus, extrà rudis, laciniis lanceolatis, acutis. *Filamenta* quinque brevissima. *Antheræ* lineares inclusæ. *Germen* turbinatum, angulatum, inferum. *Stylus* filiformis, tubo paulo longior. *Stigmata* duo, exserta, antheris duplo longiora, tetragona, elongata, parallela.

Appel, *p.* 99. *fig.* 53.

European botanists have not yet placed the *Appel* in their systems. Plukenet (*Alm.* 38.) considered it as the same with the *Tetragonia indica* of Ray, which I have no opportunity of comparing. From the nature of the oil procured from the root, and other sensible qualities, there can be little doubt that, although not quoted, it is the same with the *Sambucus zeylanica odorata aromatica* of the elder Burman (*Thes. Zeyl.* 209.), excluding the plant of Sloane.

The younger Burman (*Fl. Ind.* 132. *t.* 41. *f.* 1.) joined his father's *Sambucus* with the *Cornutioides* of Linnæus (*Fl. Zeyl.* 416.), both being called *Mendi* by the natives of Ceylon. It is true that Linnæus describes the plant *foliis integerrimis*, while Rheede has *foliorum ora, in oris superioribus, minutis et raris apicibus, alia magis alia minus eminentia;* but his figure represents them as Linnæus described; and I know several nearly allied plants (*Premnas*), which on the same branch have occasionally some leaves entire, and others indented. I have little doubt therefore that the *Appel*, being the *Sambucus odorata* of the elder Burman, has been rightly joined with the *Cornutioides* of Linnæus by the younger Burman, and by him called *Cornutia corymbosa*, but afterwards by Linnæus was made the *Premna serratifolia*.

Whether or not there be in nature any plant possessed of the characters attributed by Linnæus to *Premna* and *Cornutia*, I

know

know not: I have seen none such, although I have observed several that are described under both these names, and that all agree with the generic character of *Premna* given by Mr. R. Brown (*Prod. Flor. N. Hol.* i. 512.). None of these however could be considered as the *Sambucus zeylanica odorata aromatica;* yet one of them has been considered by excellent botanists (*Enc. Meth.* i. 216. *Hort. Beng.* 46.) as the *Premna serratifolia;* and I was long of the same opinion: but the sensible qualities of the *Appel*, as described by Rheede, are by no means reconcileable with this supposition, and therefore I think that the *Appel* must still be allowed to rest the *Cornutioides;* and although the compilers of the *Encyclopédie* (i. 216.) seem to consider it as the *Premna serratifolia* of that work, I hesitate to consider Adanson wrong in supposing the germen to be below the calyx; because in Rheede's figure several of the fruit appear to indicate their being crowned with the remains of the calyx. Should this be really the case, the figure of the younger Burman must represent a different plant from the *Appel* or *Sambucus* of his father, and may be the *Cornutia corymbosa* of the *Encyclopédie*, called a *Premna* by Willdenow, although neither author quotes him. The synonyma therefore, I think, may be

Cornutioides. *Linn. Fl. Zeyl.* 410.
Appel. *Hort. Mal.* i. 99. *t.* 53. *Pluk. Alm.* 38.
Sambucus zeylanica, odorata, aromatica. *Burm. Thes. Zeyl.* 209. excluso synonymo *Sloani*.
Cornutia corymbosa. *Burm. Ind.* 132. quod ad synonyma, sed non quod ad figuram, *t.* 41. *f.* 1.

AMERI, *p.* 101. *fig.* 54.

That Rheede here intended to describe the plant from which indigo is made, there can be no doubt, as he expressly says so: but from the small resemblance which the figure bears to the plant

plant used in India for the purpose, I suspect some mistake; and I cannot conceive how Willdenow should quote it (*Sp. Pl.* iii. 1237.) as his *Indigofera tinctoria* distinguished *foliis quadrijugis.*

Plukenet in the first place (*Alm.* 165.) refers the *Nil* or *Anil* of the Bauhins, no doubt the Indigo plant, to his *Genista tinctoria maderaspatana, &c.*, which he figures in the *Phytographia, t.* 31. *f.* 3. and which seems to be an *Aspalathus*, but which has not the smallest resemblance to Indigo. The *Ameri*, however, he referred to his *Colutea indica herbacea ex qua Indigo* (*Alm.* 112.), to which he also refers many synonyma indicative of its being the Indigo plant, although he excludes those of both the Bauhins, which belong to the real Indigo; for the plant of J. Bauhin, which he quotes as synonymous with the *Ameri*, is the *Colutea foliis Anil nominatum*, and not the *Anil seu Nil Indorum color*. Plukenet does not refer in the *Almagestum* to any figure for this plant; but in the *Phytographia* (*t.* 165. *f.* 5.) we have a *Colutea siliquosa maderaspatana ad nodos caulium siliquis bigemellis, forte Coluteæ foliis Anil nominatum* J. Bauhin, which he therefore conjectures to be the same with the *Colutea indica* above mentioned, and with the *Ameri*. This *Colutea* of Plukenet is certainly not the Indigo plant, although quoted as such in the *Encyclopédie* (iii. 245.), and without being certain, I rather think that it is a *Galega*.

Next in the *Almagestum* (54.) Plukenet starts the opinion of there being two species of the plants from which Indigo is made, one with straight legumes, and the other with crooked ones, referring for this last to his *Colutea indica, seu Indigo sylvestris polyceratos, siliquis recurvis, americanus* (*Alm.* 112.), thus indicating that the plant used in America is different from that used in India; on which idea the compiler of the *Encyclopédie* has founded speculations not at all exact; and the idea seems fully

adopted

adopted in the *Hortus Kewensis* (iv. 354.), where we have a West Indian and an East Indian Indigo.

Under the proper Latin name, *Indicum*, Rumphius (*Herb. Amb.* v. 220. *t.* 80.) has given us a true description, and not a bad figure, of the plant producing Indigo, such as is cultivated every where in India, and, as he shows, the produce originally of Gujerat; and he says that he knows only of one species. He had indeed heard of another, which grows wild (*silvestris*), but he had never seen it. There are indeed plenty of wild *Indigoferas*, and some of them not unlike the cultivated kind; but Indigo, at least on any considerable scale, was never I believe made from any of them.

The elder Burman (*Thes. Zeyl.* 69.) followed Rumphius in making only one species of the Indigo plant, and reduced to this all the synonyma referring to such a production, and of course included both the *Ameri* of Rheede and the *Indicum* of Rumphius, as well as the kind cultivated in America. I have however little doubt that the *Ameri* is some wild *Indigofera*, which was brought by mistake to Rheede, Indigo not being a production of Malabar.

Rumphius was not a favourite with Linnæus; and in the *Flora Zeylanica* (273.) is not quoted for the Indigo plant. But although Linnæus quotes the *Ameri*, he evidently meant the *Indicum* of Rumphius, from his specific character, *Indigofera leguminibus arcuatis incanis, racemis folio brevioribus*, by which the Indigo plant may at once be recognised. Linnæus here gives us only one Indigo plant; nor is any change for the worse made by the younger Burman (*Fl. Ind.* 170.), only he adds as a variety the plant of Plukenet (*Phyt. t.* 165. *f.* 5.), and from Linnæus gives the specific name *I. tinctoria*.

Although the terms *Nil* and *Anil* were used by the old writers as synonymous (the former being the name of the Indigo plant in the Bengalese and Hindwi dialects, while the latter seems to be

be the same, with the Arabic article prefixed); yet Linnæus, having received an *Indigofera* somewhat resembling the *tinctoria*, gave it the name of *Anil;* and, in endeavouring to establish specific characters between this and the *tinctoria*, Willdenow has produced such as contain little or no difference, the only real discrepancy being, that the one is said to have three pair of leaflets and the other four. This is such a difference as no one can rely upon to establish species, among plants with which the number of leaflets in the same individuals is so liable to vary. The one is also said to have leaves pubescent below, while the other has them smooth on both sides: but this depends entirely on the age of the leaf: and on the whole, on examining the Indigo plant carefully, I could not say whether it was the *I. Anil* or *I. tinctoria* of Willdenow; I only judge it to be the latter from the synonyma, which clearly indicate it to be that from which the drug is prepared, while no hint is given of the *Anil* being applied to this purpose.

In the *Encyclopédie* (iii. 244.) matters become worse and worse; the *Anil* is the true and best Indigo plant, and the *Indicum* of Rumphius, deriving its very name from India, and known as an Indian production from the most remote antiquity, is removed on Plukenet's authority to America. The distinction, too, into an Indigo plant with crooked legumes, and one with straight ones, which had been taken up by Plukenet, is repeated in the *Encyclopédie;* and the latter, in order to distinguish it from the proper American dye, is called *Indigofera indica*, an unseemly pleonasm. It is indeed admitted, that a small quantity of indifferent Indigo may be procured from this *I. indica;* and the compilers seem to think that until the time of Rumphius the true *Indicum* was not known; as the synonyma of the Bauhins and other older writers, referring to the Indigo plant, are given to the *I. indica*, which, along with the *Ameri* of Rheede, includes

the

the *Galega* of Plukenet, concerning which I have already given my opinion.* The *I. indica* of the *Encyclopédie* seems to be a spontaneous production, "*elle croit naturellement à l'Isle de France, à Madagascar, au Malabar, et dans l'Inde, aux lieux incultes pierreux ou sabloneux.*" From this I am led to conclude, that the compiler of this most valuable work was perfectly right in quoting the *Ameri* for it, and in quoting the *Indicum* of Rumphius for his *I. Anil;* but then to this last he should have transferred the synonyma of the Bauhins, Parkinson, Morison, Ray, and the elder Burman; and I have said that the plant of Plukenet is probably a *Galega* nearly allied to the *tinctoria.*

The only proper synonymous plant for the *Indigofera indica* is therefore the *Ameri* of Rheede, a spontaneous plant, and by no means that cultivated in India. It may however be the *I. cærulea* of Dr. Roxburgh (*Hort. Beng.* 57.), called *Car Nili*, or wild Indigo, by the natives, and I believe capable of yielding an Indigo, although with difficulty. Dr. Roxburgh, however, does not quote the *Ameri* as synonymous, and had in the botanical garden at Calcutta a plant, which came there by accident, and which he considered as the *I. Anil* of Willdenow. This *I. Anil* of Dr. Roxburgh was never cultivated for Indigo, and was probably indigenous in the garden, but for some time escaped the notice of the superintendent; for in such an extensive garden (several hundred acres) some spontaneous productions remained undescribed during the whole of his life.

COLONIL, *p.* 103. *fig.* 55.

Plukenet considered this as the same with his *Colutea indica frutescens, foliis supernè glabris virentibus, subtùs sericeo nitorè argenteo splendentibus* (*Alm.* 112.), and as the *Nil* seu *Indigo spurium* of Ray. Now I think that I know the *Colonil* well, and it will not agree with the abovementioned character of Plukenet:

 but

but I know another plant that is exceedingly like what I take to be the *Colonil,* and which agrees perfectly with Plukenet's character, and which I shall first describe.

Colutea indica, &c. Plukenetii.
Habitat in aridis saxosis Indiæ extra et intra Gangem.

Caulis fruticosus, pedes duos circiter altus, ramosus, erectus, ramis alternis, patentibus, angulatis, pilosis. *Folia* alterna, cum impari pinnata. *Foliola* utrinque 7—10 suprà glabra, subtùs pilis decumbentibus incana, nitida, pedicellata, oblonga, venis simplicibus striata; inferiora obtusa cum acumine, superiora emarginata cum acumine e nervo medio producto. *Petiolus* communis teres, canaliculatus, brevissimus, pilosus: partiales brevissimi, pilosi. *Stipulæ* geminæ, subulatæ, patentes, carinatæ. *Racemi* primo terminales, sed prodeunte ramulo oppositifolii, sessiles, folio breviores, erecti. *Rachis* angulatus, sulcatus. *Flores* rubri, parvi. *Pedicelli* flore breviores, recti, patentes, teretes, pilosi, ex eodem puncto bini vel terni. *Bractea* setacea, brevis, ad singulos florum fasciculos. *Calyx* pilosus, cylindraceus, quinquedentatus, denticulis subulatis, inferiore longiore. *Vexillum* subrotundum, emarginatum; lateribus revolutis adscendens. *Alæ* vexillo breviores, erectæ, obtusæ. *Carina* ovata, acuta, incumbens, alis dimidio brevior. *Stamina* diadelpha. *Antheræ* subrotundæ. *Germen* teres. *Stylus* subulatus. *Stigma* obtusum, pubescens. *Legumen* recurvatum, subarcuatum, planiusculum, acutum, torulosum, tomentosum, sed non hirtum. *Semina* plura reniformia.

The plant thus described I transmitted to Dr. Roxburgh, and we both considered it as the *Galega tinctoria*, under which name it stands in the *Hortus Bengalensis* (57.); but, according to the *Flora*

Flora Zeylanica (302.), in that plant there are "*legumina stricta glabra, caulis glaber, pedunculi ex singulis alis nudi, apice spicati, glabri.*" I must therefore now acknowledge the plants to be different, and Plukenet's I shall call

Galega (seu *Tephrosia*) *sericea*, leguminibus pubescentibus arcuatis recurvis, foliolis 8—10-jugis subtùs sericeis cuneatis, racemis oppositifoliis sessilibus, stipulis subulatis.

The plant, which I suppose to be the *Colonil*, I found in the south of India very abundant, and I have since found it in the north. Dr. Roxburgh considered it as the *Galega purpurea*, in which opinion I long agreed with him. It differs from the one above described merely in being entirely smooth; but agrees very well with almost every thing said in the *Flora Zeylanica* (301.) and in Willdenow (*Sp. Pl.* iii. 1247.) concerning the *Galega purpurea*, only the legumina cannot be called *stricta adscendentia*, they are *recurvata subarcuata*. This is so small a difference, that I overlooked it until I compared the plant with the *Coronilla zeylanica herbacea flore purpurascente* of Burman (*Thes. Zeyl.* 77. *t.* 32.), which is the proper authority for the *Galega purpurea;* and I now am convinced that I was mistaken, the plant of Burman having racemes longer than the leaves and supported by long peduncles. I therefore now call this plant

Galega (seu *Tephrosia*) *Colonila*, leguminibus glabris arcuatis recurvis, foliolis 8—10-jugis subtùs nudis, racemis oppositifoliis sessilibus, stipulis subulatis.

Habitat in Indiæ aridioribus. Vidi in Carnata, Draveda, Magadha.

Galega tinctoria differt foliis subtùs sericeis.

The examination of the difficulties respecting the *Colonil* having led me to consider some of the other species of *Galega* or *Tephrosia*

phrosia which I saw in India, I may here give the result. In my journey to Mysore, I had an opportunity of observing the *Securidaca Maderaspatana, siliquis falcatis fulvis et villosis, plurimis circa ramulos stellatim positis*, of Plukenet (*Alm.* 339., *Phyt. t.* 59. *f.* 6.), which is the *Galega villosa* of Willdenow (*Sp. Pl.* iii. 1245.); and also the *Coronilla zeylanica, siliquis fuscis hirsutis pilosis, flore albo*, of Burman (*Thes. Zeyl.* 78. *t.* 33.), which Willdenow makes a variety of the former; and in this the *Encyclopédie* agrees with him (ii. 597). I must admit that the two plants have a strong affinity; but that any change of soil or culture produces such a difference of appearance as exists, remains to be proved. The latter plant I think is probably the *Galega incana* of Dr. Roxburgh (*Hort. Beng.* 57.), but of this I am not sure. In the collection which I gave to Sir J. E. Smith, from Mysore, it was called *Galega hirta*, under which name I shall here describe it.

Galega (seu *Tephrosia*) *hirta*, leguminibus falcatis pendulis hirtis, racemo oppositifolio foliato pedunculato, foliolis cuneatis emarginatis, caule erecto.

Habitat in ruderis Carnatæ Julio florens.

Radix ramosa, lignosa, perpendicularis. *Caulis* infrà lignosus, cubitum altus, erectus, teres, tomentosus, ramosissimus. *Rami* patentes, dichotomi, subtetragoni. *Folia* alterna, subsessilia, cum impari pinnata. *Foliola* opposita, 4—8-juga, cuneiformia, integerrima, emarginata, obliquè striata, suprà glabra, subtùs pilis longis incumbentibus pubescentia. *Stipulæ* geminæ, laterales, e petiolo distinctæ, persistentes, rigidæ, e basi latissima acuminatæ, patentes, integerrimæ, mediocres. *Racemi* erecti, folio longiores, oppositifolii, pedunculo communi villoso, angulis quatuor vel quinque acutis subulato. *Flores* nutantes ternati, interme-

dio

dio sæpe abortivo. *Bracteæ* minutæ, sessiles, ad singulos florum fasciculos ternatæ; intermedia ovata acuta, lateralibus stipulæformibus: intermediæ locus ad fasciculos inferiores sæpe per folium occupatus. *Flores* cærulescentes carina alba. *Calyx* hirtus, ultra medium quinquefidus laciniis subulatis, subæqualibus, longitudine ferè corollæ. *Vexillum* magnum subrotundum, extrà hirtum. *Alæ* falcatæ, obtusæ, angustæ. *Carina* tenuissima. *Filamenta* simplex et novemfidum, laciniis alternis longioribus. *Antheræ* æquales. *Germen* lanatum. *Stylus* subulatus. *Stigma* pilis terminalibus barbatum. *Legumen* retrofalcatum, calyce multoties longius, planum, emarginatum, hirtum, valvis inter semina conniventibus. *Semina* circiter sex.

Galega (seu *Tephrosia*) *villosa* Octobre floret in Carnata, et differt caule procumbente; foliolis ferè obcordatis, suprà pilosis, subtùs villosis; floribus ad folia subsessilibus, congestis.

Very nearly allied to the last-mentioned plant is one which I found also in my journey to Mysore, and which in the collection made there is called

Galega (seu *Tephrosia*) *procumbens*, leguminibus strictis rectis pilosis, caule prostrato hirto, racemo oppositifolio foliato, stipulis setaceis, foliolis utrinque hirsutis.

Habitat in umbrosis Carnatæ Septembri florens.

Radix lignosa, caule crassior, descendens. *Caules* plures, infrà lignosi, procumbentes, filiformes, pilis longis hirsuti, subdichotomi, flexuosi. *Folia* alterna, impari pinnata. *Foliola* 4—5-juga, pedicellata, cuneiformia, opposita, integerrima, mucronata, obliquè striata, utrinque hirsuta, superioribus sensìm longioribus. *Petiolus* communis foliolo brevior, hirsutus. *Stipulæ* geminæ, laterales, e petiolo enatæ, persistentes,

tentes, setaceæ, patentes, hirsutæ, brevissimæ. *Racemus* oppositifolius, ante florescentiam brevissimus, sed posteà folio longior. *Flores* parvi, albidi, penduli, pedicellati, ex eodem puncto gemini. *Folium* florale caulino simile, ad imum par florum sæpe, sed non semper, adest; ad cætera florum paria bracteæ forma stipularum præditæ. *Calyx* pubescens, ultra medium quinquefidus laciniis setaceis longitudine corollæ. *Vexillum* subrotundum, exterius pubescens. *Alæ* longitudine carinæ. *Filamenta* simplex et novemfidum. *Antheræ* subrotundæ. *Stigma* subrotundum. *Legumen* erectiusculum, lineare, rectum, hirsutum, compressum, marginatum, obtusum cum cuspide reflexo, valvis inter semina discretis. *Semina* circiter novem compressiuscula, utrinque truncata, approximata.

The distinction between *Tephrosia*, *Reinaria*, or *Brisonia* and *Galega* seems to me ill defined, and of little use. This plant last described perhaps should be a *Galega*, and the others *Tephrosias?*

SHERIGAM COTTAM, *p.* 105. *fig.* 56.

The other species of *Cottam* mentioned in the text, and which Syen the annotator could not discover, may be found in the *Cottam* (*part* i. *t.* 22.), or in the *Tsieriam Cottam* (*part* v. *p.* 21. *t.* 11.), neither of which, however, has any affinity with this plant.

The elder Burman (*Thes. Zeyl.* 159. *t.* 74.) describes a plant, which the Dutch in Ceylon called *Kleine Cocos*, or small Coco (*Theobroma*), translated in the *Encyclopédie* '*petite Coque, comme si l'on disoit arbrisseau à petites coques!*' This name, *Kleine Cocos*, using rather freely the form *Aphæresis*, or perhaps *Synalæpha*, Burman made into botanical Greek, *Microcos*, a word at any rate sufficiently utterable, and of reasonable length. He

was

was less fortunate in comparing it with the *Catutekka* (*Katou Theka*) of the *Hortus Malabaricus* (iv. *t.* 28.), which seems to be one of the *Rubiaceæ:* but, what was of more importance, he gave a good figure and description, which Linnæus (*Fl. Zeyl.* 207.) perceived belonged to the same plant with the *Schageri Cottam;* and, adopting the generic name of Burman, called the plant *Microcos panicula terminatrice.*

In imitation of Linnæus in the *Species Plantarum*, the younger Burman (*Fl. Ind.* 127.) called this the *Microcos paniculata;* and another author was discovered to have described the plant, Plukenet having mentioned it by the name of *Arbor malabarica mucronatis firmioribus venosis foliis Cacaviferæ æmulis, floribus ad summum ramulorum comantibus* (*Alm.* 40., *Phyt.* 262. *f.* 3.), which shows that there is a real resemblance between this plant and the *Theobroma*, as it struck not only the Dutch of Ceylon, but the botanist Plukenet. Linnæus afterwards abolished the genus *Microcos*, and the *Scherigam Cottam* was called *Grewia Microcos*, under which denomination it still remains in the *Encyclopédie* (iii. 44.) and *Hortus Kewensis* (iii. 301). Gærtner, however, on examining its fruit with care, declares that it cannot be classed with the *Grewia* (*de Sem. &c.* i. 273.); and in fact it belongs to the order of *Tiliaceæ*, while the *Grewia* has no albumen in the seeds. Willdenow therefore restores the old name, *Microcos paniculata.*

Both in Ava and Bengal I have found a small tree or large shrub very nearly allied to the *Microcos*, but differing from the *Schageri Cottam* in the form of the leaves. Of this I shall now add a description.

Microcos Mala, foliis apicem versus latioribus, subtùs glabris.

Ma-la Barmanorum.

Habitat in dumetis Bengalæ orientalis, et in regno Peguensi vulgatissima est arbuscularum.

 Arbuscula

Arbuscula vel *Frutex* magna cortice cinereo, punctis elevatis aspero. *Ramuli* virides, pilosi. *Folia* alterna, bifaria, approximata, apicem versus latiora, apice acuminata, ad basin emarginata, serraturis minutis incisa, trinervia, venis minutissimè reticulata, glabra, suprà nitida. *Petiolus* teres, ad apicem incrassatus, brevissimus, pilosus. *Stipulæ* geminæ, laterales, erectæ, bipartitæ, sessiles, lanceolatæ, petiolo dimidio breviores. *Panicula* terminalis, ramosissima, patens, ramis divaricatis, teretibus. *Bracteæ* ad basin pedicellorum stipulæformes; ad apicem triphyllæ, obtusæ, deciduæ, trifloræ. *Flores* parvi, lutei, ad apices singulorum pedicellorum terni. *Calyx* pentaphyllus foliolis patentibus, deciduis, concavis, obtusis, oblongis, apices versus latioribus, coriaceis. *Petala* quinque calyce alternantia, hujusque foliolis multo breviora, cavitate melliferâ ad unguem insculpta, apice acuta. *Filamenta* plurima, inæqualia, subulata, hypogyna. *Germen* superum, sessile, subrotundum. *Stylus* subulatus. *Stigma* simplex.

Drupa globosa, nuce, abortu forte loculorum 1 vel 2, di- vel trisperma.

Obs. *Microcos paniculata* folia habet basin versus latiora, subtùs tomentosa, et secundum Burmannum bracteas (calycem communem) heptaphyllas.

Carua, *p.* 107. *fig.* 57.

Rheede evidently took this for the Cinnamon in its uncultivated state; and Burman was of the same opinion: for although he does not quote the *Carua* as synonymous with his *Cinnamomum foliis latis, ovatis, frugiferum* (*Thes. Zeyl.* 62.), he says, "*Cinnamomi* descriptio in *Horto Malabarico* accurata et egregia exhibetur;—ita ut licet hæc nostræ *Horti Malabarici* figuræ non respondeat, ipsum tamen et legitimum sit *Cinnamomum*;—notatum

tum autem illud volo, quod hæc nostra a Malabarica illa tantum loco natali differat:" and that he meant no other plant than the *Carua* is clear from his saying, " vide porro notas ad *Horti Malabarici partem* i. *p.* 110," that is, the notes of Syen at the end of the account of the *Carua*. To this opinion however there are strong objections, as any one may readily see who compares the figure in the *Hortus Malabaricus* with that in the *Thesaurus Zeylanicus* (*tab.* 27.). Burman's next figure (28.) has a much stronger resemblance to that of the *Carua;* but then, from the description, it is evidently a *Laurus*, which I know the *Carua* to be. I therefore adopt the opinion of Plukenet, who notices three plants that I well know, and concerning which it will be necessary to enter into some detail.

Plukenet's first plant is the *Cassia cinnamomea* (*Alm.* 88.), the *Cinnamomum* of the Bauhins, &c.

His second plant is the *Cassia cinnamomea sylvestris pigrior Malavarica, Carua Hort. Mal.* (*Alm.* 88.), the *Arbor canellifera Malabarica, cortice ignobiliore, cujus folium Malabathrum officinarum Breynii.*

His third plant is the *Cassia cinnamomea, strictiore folio, ignobilior, cujus folium est Malabathrum seu Tamalapatrum angustifolium; in officinis frequens occurrit.*

I need not here enter into any discussion concerning the proper Cinnamon tree, of which Burman (63.) enumerates nine varieties, besides the royal (*Rasse Coronde*) kind; and these, in a botanical sense, are all probably mere varieties: but in the botanical garden at Calcutta there is a narrow-leaved *Laurus Cinnamomum*, which was introduced long before the English took Ceylon, while the true royal kind (*Rasse Coronde*) was sent by General Macdowal when he governed the island. Now, in my opinion, this narrow-leaved Cinnamon is the *Carua* of the *Hortus Malabaricus*, not described by Burman, while what Dr. Roxburgh called

the *Laurus Cassia* is the third species of Plukenet, or *Malabathrum angustifolium*. We have thus two species of *Malabathrum*, in my opinion a corruption, by rejecting the first syllable of *Tamalapatrum*, that is, the *Tamala* leaf: and I shall have occasion to show, that in the north of India we have some more varieties, the name of the tree there being *Tej*, *Taj*, or *Twac*, which gives us *Tejpatra*, &c. for the leaves: for in the south the name of every thing great or good changes the final *a* of the north into *um*.

But to return to the *Carua*: Dr. Roxburgh (*Hort. Beng.* 30.) thought that his narrow-leaved Cinnamon was the *Cinnamomum perpetuo florens, folio tenuiore, acuto* of Burman (*Thes. Zeyl.* 63. *t.* 28); but, according to Burman, this is not the *Carua*, but the *Katou Karua* of the *Hortus Malabaricus* (v. *t.* 53.); and from the description of both authors, it is evident that this plant is not a *Laurus*, having a monopetalous corolla and five stamens.

Linnæus in the *Flora Zeylanica* (145.) gave the synonyma of the *Laurus Cinnamomum* very correct: but in treating of the *Laurus Cassia*, that is, the *Cassia malabarica*, which I have no doubt is the *Carua*, he seems to me to have fallen into two errors; first, in quoting as synonymous Burman's *tab.* 28., which is not the *Carua*, but the *Katou Karua*; and secondly, in quoting the *Cassia cinnamomea myrrhæ odore, folio trinervi subtùs cæsio*, a fourth species of Plukenet (*Alm.* 89.), of which I know nothing but that it is quoted by Burman for the plant represented in his *tab.* 28., while Plukenet, as I have already mentioned, quotes the *Carua* for his second species.

The *Carua* is a tree very common in the province of Malabar, and its bark is exported from thence in considerable quantity, now indeed chiefly to the Muhammedan countries, Christians receiving a better drug from China. This latter is no doubt the produce of a different tree (probably the *Laurus Cubeba* of Loureiro), the buds or young fruit of which are an article of commerce;

merce: and this also is the case with the buds of the *Cassia malabarica*, which in Malabar are called *Cubeba*. The accounts of a *Cubeba*, produced by a species of *Piper*, seem to have rendered Loureiro's report suspected by the compiler of the *Encyclopédie* (*Supp.* iii. 318.), but without reason. *Cabab*, in the native language of India, signifies a kind of roast, like that of the heroes in Homer:

Μιστυλλον τ᾽ αρα τ᾽ αλλα, και αμφ᾽ οβελοισιν επειραν.

Now any spice suited for garnishing such roasts, by sticking it between the rows of minute bits (*μιστυλλον*) of meat, transfixed in a row by the wooden skewer (*οβελος*) on which they are roasted, is called a *Cabab* or *Cubeba*; and the sharp pedicels of both the *Cassias*, as well as of the *Piper*, serve for this purpose.

The younger Burman (*Fl. Ind.* 91.), following Linnæus, called the *Cassia malabarica* the *Laurus Cassia*, with the same synonyma as in the *Flora Zeylanica;* but he introduced a new species, the *Laurus Malabatrum*, composed of the *Katou Karua* (*Hort. Mal.* v. *t.* 53.), which is undoubtedly the same with his father's plant (*Thes. Zeyl. t.* 28.), which he quotes for the *Laurus Cassia*. He joins to the *Katou Karua*, the *Sindoc* of Rumphius (*Herb. Amb.* ii. 69.), which may indeed be the same plant, there being no figure, and a description so imperfect that it may be referred to almost any of the species, which nearly resemble the Cinnamon. Willdenow abandons this *Malabathrum*, there not being the slightest indication in either Rheede or Rumphius of its leaves possessing the qualities of the drug; and he makes the *Katou Carua* with five stamens, and a flower divided into five, a mere variety of the *Laurus Cinnamomum*.

In that valuable collection the *Encyclopédie Méthodique* (iii. 433.) we have the synonyma of the *Laurus Cinnamomum* properly enough given. To these, given by Linnæus to the *Laurus Cassia*,

Cassia, we have added the second species of Plukenet already mentioned, but without excluding his fourth species, probably the same with the *Katou Carua;* and Burman's *Thes. Zeyl. t.* 28. is quoted with doubt, and supposed, notwithstanding his description, to be a male plant of the *Laurus Cinnamomum.* It is however pretty clear that the compiler did not examine the description, his attention having been entirely occupied by the figure. After describing the plant, in many respects well, and pointing out some differences between it and the Cinnamon, the compiler endeavours to show that the *Cortex caryophylloides* of Rumphius (*Herb. Amb.* ii. 65. *t.* 14.), called *Laurus Culilaban* by Linnæus, is in reality the same with the *L. Cassia.* His reasons and arguments, resting on the mistaken notion of Linnæus respecting the leaves of the Cinnamon and Cassia being alternate, while those of the *Culit lawan* are opposite, only show how little was very lately known in Europe concerning these trees and others nearly allied to them. Dr. Roxburgh (*Hort. Beng.* 30.) divided the genus *Laurus* into those having opposite leaves, and those with leaves placed alternately; and among the former are justly placed the *Cinnamon*, *Cassia* and *Culit lawan*, with five other species; and Dr. Roxburgh observed from nature. Opposite leaves is the proper and regular disposition in these three plants, although in the same individuals examples may be often observed of the leaves being subalternate. Rumphius considered his *Cortex caryophylloides* as being different from the *Cassia lignea*, the usual name in commerce for the bark of the *Laurus Cassia;* but I would build little on that supposition, because the *Cassia lignea* to which he alludes is that of the Philippine islands, probably the same with that of China: but Dr. Roxburgh had obtained from the Moluccas a species, which he considered as different from both the narrow-leaved *Cinnamon* and *Cassia*, and for which he quotes the *Cortex caryophylloides* of

Rumphius

Rumphius (*Hort. Beng.* 30.); yet still I have doubts on this head, the name of Dr. Roxburgh's plant in its native country not being *Culit lawan.*

After this long discussion, I shall give what I consider the proper synonyma of the *Carua.*

Cassia cinnamomea, sylvestris pigrior Malavarica. *Pluk. Alm.* 88.

Cortex caryophylloides. *Herb. Amb.* ii. 65. *t.* 14?

Laurus foliis lanceolatis trinerviis, nervis supra basin unitis. *Linn. Fl. Zeyl.* 146. exclusis synonymis *Burmanni, Plukenetii* et *Hermanni.*

Laurus Cassia foliis triplinerviis lanceolatis. *Linn. Sp. Pl. Burm. Fl. Ind.* 91. *Willd. Sp. Pl.* ii. 477. *Hort. Kew.* ii. 427. exclusis synonymis supradictis.

Laurus Cassia foliis lanceolatis utrinque acutis triplinerviis, paniculis laxis sublateralibus. *Encycl. Meth.* iii. 444. exclusis synonymis *Pluk. p.* 89. et *Burmanni.*

Laurus Cinnamomum angustifolium. *Hort. Beng.* 30.

I shall now proceed to describe the tree which Dr. Roxburgh called the *Laurus Cassia*, and which I think the third species of Plukenet, as I have mentioned in the former part of this account. I call this *Tamala*, from the native name given in Plukenet, while the *Laurus Cassia* or *Carua* was in Malabar called to me *Lavanga*, from its having a smell of Cloves; and this excites a suspicion, notwithstanding what I have said, that the *Carua* is in fact the *Cortex caryophylloides* of Rumphius.

Laurus Tamala, foliis triplinerviis lanceolatis utrinque acutis, paniculis terminalibus, ramulis teretibus.

Laurus Cassia. *Hort. Beng.* 30.

Cassia

Cassia cinnamomea strictiore folio ignobilior, cujus folium est Malabathrum vel Tamalapatrum angustifolium, in officinis frequens. *Pluk. Alm.* 89.

Taj Bengalensium.

Colitur in hortis Camrupæ.

Arbor magnitudine mediocris, ramis teretibus, glabris. *Folia* nunc opposita, tunc in eadem arbore alterna, e tribus ad quinque pollices longa, unicum circiter lata, oblonga sed medium infra latiora, utrinque acuminata, margine cartilagineo integerrima, crassa, suprà nitida, subtùs glabra et glauca, triplinervia, venis minutè reticulata. *Petiolus* brevissimus, canaliculatus, glaber, estipulaceus. *Panicula* terminalis, sessilis, folio longior, brachiata, trichotoma, divaricata, rachi quadrangulari, ramis compressis glabris. *Flores* parvi, in capitulis subcongesti: expansos non vidi. *Bacca* calyce obsoletè sexlobo cincta, ovalis, utrinque obtusa, magnitudine pisi majoris. *Semen* unicum ovatum. *Cotyledones* crassæ, hinc planæ. *Radicula* adscendens. *Cortex* ramorum parum aromaticus. *Folia* valdè aromatica, odore Cinnamomi forti. *Siccata* ubique in Bengala pro Malabathro vel Tejpatra venalia.

The *Tamala* is readily distinguished from the *Carua* or *Cassia* by the smallness of its berry, that of the *Carua* resembling a small acorn. The *Culit lawan* of Dr. Roxburgh is distinguished by having the flowers collected by threes.

Besides both this *Tamala* and the *Culit lawan* of Dr. Roxburgh, I have met with some other species that approach very near to the *Carua*.

1. At Nathpur, on the Cosi river, I obtained specimens of another tree called *Taj* by the natives, but its leaves and bark were destitute of the aromatic smell and taste by which the *Tamala*

mala and *Carua* are distinguished. The specimen was only in leaf, but agreed in every respect with the description of the *Tamala*, except that the leaves were acuminated, and the small branches quadrangular, with two of the sides narrower than the others. This I shall call

Laurus Tazia, foliis triplinerviis lanceolatis acuminatis, ramulis quadrangularibus.
Taj montanorum.
Habitat in montibus Emodi inferioribus ad Cosam fluvium.

2. At the same place I procured similar specimens of a tree, which has a strong resemblance in qualities to the *Carua*, and which forms a third kind of *Malabathrum*, its leaves being commonly sold as the *Tajpatra* in the markets of Mithila, although their smell and taste are inferior to those of the kind cultivated in Camrupa: both however become more aromatic when dried than they are in the recent plant. The bark of the larger branches and stem contains a considerable degree of aromatic smell and taste, on which account it is used as a spice; but it is thick and rough, very unlike Cinnamon, or the *Cassia lignea* of China, and, like that of the *Carua* and *Cortex caryophylloides*, is very mucilaginous. I shall retain the name given to the tree by the mountain Hindus, who brought it to me.

Laurus soncaurium, foliis oblongis utrinque acutis subtriplinerviis, venis nonnullis minoribus subtùs prominulis.
Laurus japonica. *Herb. Amb.* vii. *p.* 63?
Soncouri montanorum.
Habitat in montibus Emodi superioribus apud Cosam fluvium.

Arbor ramis suboppositis, teretibus, glabris; *ramulis* compressis, subquadrangularibus; *cortice* nonnihil aromatico. *Folia* nunquam opposita, sed per paria sæpe approximata, oblonga,

longa, utrinque acuta, nunc apicem, tunc basin versus latiora, et sublanceolata, margine cartilagineo integerrima, rigida, utrinque glabra, subtùs glauca, nervis lateralibus non omnino oppositis triplinervia, nervis nonnullis vagis subtùs prominulis et venis minutis transversis reticulata. *Petiolus* brevissimus, semiteres, estipulaceus.

3. In the gardens at Rangpur I found growing a tree, said to have been introduced from the mountains of Bhotan, and which, owing probably to the heat of the climate at Rangpur, did not produce flowers. Its name was not known. I shall therefore call it after the Sanscrita appellation of the country of which it is a native.

Laurus sailyana, foliis utrinque acutis, lanceolato-ovatis, subquintuplinerviis.

Habitat in montibus Emodi superioribus prope Tistam fluvium.

Arbor mediocris ramis suboppositis, teretibus, glabris; *ramulis* compressis, subquadrangularibus. *Folia* sæpiùs subopposita, oblonga, sed basin versus sæpiùs latiora, utrinque acuta, integerrima, utrinque glabra, subtùs glauca. *Nervus* utrinque ad basin folii minutus, decurrens; intermedius paulo supra basin semper trifidus ramis lateralibus bifidis, vel sæpe bipartitis, unde folium, posthabitis nervis lateralibus minutis, quasi quintuplinervium, venis transversis obsoletè reticulatum.

Vis aromatica tota in radicis cortice posita. Hic autem cortex lævis, colore lateritius, odoratissimus, sapore grato aromaticus. *Cortex* ramorum et folia insipida, inodora.

4. In the woods of Camrupa, on the banks of the Tista, I found a tree, which I at first took to be the *Katoù Carua* of the

Hortus

Hortus Malabaricus from the great size and form of its leaves; and therefore I supposed it to be the *Laurus Malabratum* or *Malabathrum* of the *Encyclopédie* (iii. 445.): but the plant I found is a *Laurus*, which the *Katou Carua* is not; and the leaves and bark, both of its root and branches, were devoid of aromatic smell or taste. I suspect however that it is the same with the *Laurus malabathrica* of Dr. Roxburgh, who would never have classed a plant in the genus *Laurus*, which had five stamens and a quinquefid petal; and he quotes the figure alone of the *Katou Carua*, having probably never looked at the description. The tree was in the garden when he took charge, so that he did not know from whence it came. I adopt the native name, as its leaves are never used for the *Malabathrum*.

Laurus Bejolghota, foliis triplinerviis basi acutis, paniculis terminalibus, pedicellis subtrifloris, cortice foliisque insipidis.
Laurus Malabathrica. *Hort. Beng.* 30?
Bejolghota Bengalensium.
Habitat in sylvis Camrupæ ad Tistam fluvium.

Arbor magna ramulis tetragonis, obtusangulis, glabris, oppositis. *Folia* plerumque opposita, pedem ferè longa, tres pollices lata, elliptica vel oblonga, sed supra medium plerumque latiora, nervo marginali integerrima, basi acuta, utrinque glabra, suprà nitida, subtùs glauca, crassa, triplinervia, venis vagis minutè reticulata; omnium, quæ vidi, apices insectis erosi. *Petiolus* brevissimus glaber, depressus, subanceps, estipulaceus. *Paniculæ* facie terminales, plures patentes, subtrichotomæ, rachi tetragono, ramulis compressis. *Flores* parvi, subterni. *Paniculæ* fructiferæ, fortè prodeunte novo ex gemma terminali ramulo, infrafoliaceæ, ut in similibus plerumque fit, nam fructum non vidi.

 5. From

5. From the Morang hills specimens of the branches in leaf, and of the bark of the root of a tree, were brought to me at Nathpur. The former so much resembled those of the *Bejolghota* before described, that I should have had no doubt of the two trees being the same, had it not been for the bark of the root, which strongly resembled that from Bhotan. It is remarkable, that the top (apex) of every leaf in this as well as in the *Bejolghota* was eaten off by insects. I call this by the native name

Laurus Bazania, foliis triplinerviis utrinque acutis inodoris, cortice radicis aromatico.

Bajania montanorum.

Habitat in montibus Emodi superioribus prope Cosam fluvium.

Cortex radicis fuscus fortiùs et gratè odoratus, sapore cinnamomeo præditus. *Cortex* ramorum et folia inodora insipida, unde a *Katou Carua* certè diversa. Neque flores neque fructus vidi.

XXIV. *Ob-*

XXIV. *Observations on the Chrysanthemum Indicum of Linnæus. By Joseph Sabine, Esq. F.R.S. and L.S. &c.*

Read December 18, 1821.

Having been lately engaged in an examination* of the plants cultivated in the English gardens under the name of Chinese Chrysanthemums, and which have generally been considered by English botanists as varieties of the *Chrysanthemum Indicum* of Linnæus, I have been led to adopt the opinion, that the plants which he intended to designate by that name, are different from those to which the appellation has of late been applied in this country. And as these plants were sufficiently described by different writers, at the time when Linnæus formed the character of his species, and referred it to the plants of various authors which he quoted, I consider that his omission of reference to the others must be taken as evidence that he did not deem it expedient to unite the whole.

When the first of the Chinese Chrysanthemums now in our gardens was introduced into France in 1789, M. Ramatuelle†, who published an account of it, called it *Anthemis grandiflora*. Willdenow‡ subsequently, in 1801, placed it under the same genus; but he gave it another specific name, calling it *Anthemis*

* See *Horticultural Transactions*, vol. iv. p. 326. "Account and Description of the Varieties of Chinese Chrysanthemums, &c."

† *Journal d'Histoire Naturelle*, vol. ii. p. 233.

‡ Willdenow in *Nov. Act. Soc. Nat. Scient. Berol.* vol. iii. p. 431.

Arte-

*Artemisiæfolia** ; and as a proof that he considered it to be quite different from the *Chrysanthemum Indicum* of Linnæus, he retained that plant as distinct, leaving it in its proper station in his *Species Plantarum*†. Another author ‡ has called the Chinese Chrysanthemum *Anthemis stipulacea.* The reason for the removal of it from *Chrysanthemum* to *Anthemis* was, that paleæ were found to exist on the receptacle at the base of the florets, and that circumstance constitutes part of the character of *Anthemis* and not of *Chrysanthemum*, the receptacle of which is naked.

The plant now known as the Purple Chinese Chrysanthemum, which had been described in France by M. Ramatuelle, was sent to England by M. Cels in 1790 ; a description and figure of it were published in the *Botanical Magazine* (*pl.* 327.) in 1796, where it was called *Chrysanthemum Indicum ;* but no notice was taken of M. Ramatuelle's observation or change of name. In the second edition of the *Hortus Kewensis*§ it is also given as *Chrysanthemum Indicum.* At the time (1813) of the publication of that work several varieties, which are enumerated, had then been introduced ; M. Ramatuelle's memoir is referred to in it, and Willdenow's *Chrysanthemum Indicum* as well as his *Anthemis Artemisiæfolia* are quoted as belonging to the species. The same opinion of the application of the references was held by the Editor of the *Botanical Register*‖ in 1815, who gave figures of two of the varieties, accompanied with some observations on the species. The authors of those works appear to have considered that the existence of the paleæ on the receptacle in the cultivated plants was only the effect of luxuriance, and not likely to

* Willdenow *Sp. Pl.* vol. iii. p. 2184. Willd. *Enum.* vol. ii. p. 911.

† Willdenow *Sp. Pl.* vol. iii. p. 2147.

‡ Mœnch *Supplementum ad Methodum Plantarum,* p. 258.

§ vol. v. p. 95. ‖ vol. i. plate and p. 4.

be

be found in the wild state of the species, and that therefore the placing them under *Chrysanthemum* was still correct.

In the *Botanical Register* (*p.* 527.), under the article *Anthemis apiifolia*, will be found the reasons why it is still considered proper to refer the plants in question to *Chrysanthemum;* but this is not a point which I am desirous of entering into, my only object being to ascertain what plants were considered by Linnæus as belonging to his *Chrysanthemum Indicum*, and whether it is not probable that he contemplated the separation of the Chinese Chrysanthemums from it.

The first notice of *Chrysanthemum Indicum*, as a species, under that name, is in the first edition of the *Species Plantarum**, published in 1753. In that work Linnæus makes two varieties of the plant; his first, the *Var.* α, is described from his own Herbarium, and is also referred to a description and figure of Plukenet; the *Var.* β is referred to another plant, which is also described and figured by Plukenet, as well as to Linnæus's own account in his *Flora Zeylanica*† of a specimen in the Herbarium collected by Hermann, between the years 1670 and 1677, in the Island of Ceylon. It seems, from the observations in the *Flora Zeylanica*, that in considering the plant as belonging to *Chrysanthemum*, the attention of Linnæus had not been directed to the paleæ on the receptacle, but to the formation of the calyx, which appeared to accord with that of *Chrysanthemum*; so that, in fact, this point of difference between the two genera of *Chrysanthemum* and *Anthemis*, which is so much relied on by later botanists, had not been under Linnæus's consideration when he fixed the place of the plant he had described.

Before I proceed further to observe on the works referred to by Linnæus, it will be expedient to examine the original writers

* vol. ii. p. 889. † *Flora Zeylanica*, p. 198. no. 421.

on

on the plants of China and Japan, from which countries all the plants are derived. Kæmpfer, Thunberg, and Loureiro have noticed them, and their observations will materially assist in the investigation of the subject.

Kæmpfer's Account of the Plants of Japan was published in 1712 (neither Linnæus nor Willdenow refer to his work in either of their editions of the *Species Plantarum*); he describes* the plants we call the Chinese Chrysanthemums, under the name of *Matricaria*, as growing both wild and in gardens in Japan, being called by the natives *Kik*, *Kikf*, or *Kikku;* he mentions that there are many varieties, some of which are in blossom at all times of the year, and that they are a principal ornament of the gardens in the towns. He distinctly describes eight with double flowers; the first has flowers variegated with red and yellow, about one inch in diameter, having a small yellow disc; the second has flowers variegated with red and yellow, three inches in diameter, and without any apparent disc; the third has a very double golden-coloured blossom without a disc, as large as a double hundred-leaved Rose, and having broad fragrant leaves; the fourth has white flowers, of various sizes, without any disc; the fifth has its flowers slightly flesh-coloured, two inches in diameter, and without a disc; the sixth has reddish-purple flowers, with a moderately-sized disc; the seventh is a plant with numerous branches, flowering abundantly, its flowers being scarlet suffused with dingy red, having a yellow disc of an inch in diameter; in the eighth the flower is an inch and a half in diameter, the radial florets being white, with purple at their ends, yellow tubular florets being mixed with them. In addition to these, he mentions other plants with flowers of very different characters from the preceding, which he appears to have considered as in

* Kæmpfer *Amœnitates Exoticæ*, pp. 875—877.

some

some way connected with them, and therefore I notice them, though I do not suppose that they belong to those on which I am now treating.

Thunberg in his *Flora Japonica*, published in 1784, describes* the plant which he considers as Linnæus's *Chrysanthemum Indicum*, and refers it to the preceding account of Kæmpfer. He states, that it is called by the Japanese† *Kikokf*, *Kiko no Fanna*, *Kik*, *Kikf*, or *Kikku;* that it has many varieties, different in the colour as well as size of the flowers; and also that there are single- and double-flowering plants of it; that it is much cultivated in the houses and gardens of Japan, on account of the beauty of its flowers; that it grows spontaneously at Papenberg near Nagasaki, and other places in Japan; and that it flowers in the summer and autumn months.

Loureiro published his Description of the Plants of Cochinchina in 1790, and amongst them enumerated‡ the *Chrysanthemum Indicum* of Linnæus, to whose *Species Plantarum* he refers, adopting his character of the plant. Loureiro's description of the stem and leaves belongs exactly to the Chinese Chrysanthemums, and it was certainly those plants which he meant to describe. He represents them as having double flowers; that is, with the florets all ligulate, and adds, that their receptacles were naked; but to this last assertion I attach little importance, it being probable that, as he knew that the genus (according to Linnæus) ought to have that character, he assigned it without examination; we know the fact to be, that their receptacles are chaffy.

* Thunberg *Flora Japonica,* p. 320. *Chrysanthemum Indicum.*

† Some of these names are slightly different from those given by Kæmpfer, but the difference is only in the terminations, of which there are several united to *Kik*. The addition in the second name is only expressive of elegance; the term *Fanna* being usually added by the Japanese, when they desire to mark a plant as possessing such character.

‡ *Flora Cochinchinensis,* p. 499. edit. 2.; a *Willdenow,* vol. ii. p. 610.

chaffy. His description of the varieties is very perfect; they differ, he says, a little in the form and size of their leaves and in the size of their stems, but most in the colour of their flowers, which are white, flesh-coloured, purple, violet-yellow, and red, and three inches and more in diameter. These varieties, he states, are cultivated in the gardens of Cochinchina and China, on account of the beauty of their flowers, but he adds that the odour of the whole plant is disagreeable.

The preceding accounts are all referable without difficulty to the plants called Chinese Chrysanthemums, for there is nothing recorded by these authors which does not well agree with those varieties we already know, save that it is stated by Thunberg that some of them blossom in the summer, and by Kæmpfer that they are in flower in all seasons*. But they do not well apply to any of the descriptions and accounts quoted or given by Linnæus under *Chrysanthemum Indicum.*

I have already referred to the account in the first edition (published in 1753) of the *Species Plantarum;* but as Linnæus in his second edition† of that work (published in 1762-3) added some references (viz. those to Rheede and Rumphius), which were not in the former, it will be advisable to take the latter publication as the basis of the inquiry. The whole article in it is as follows:

Chrysanthemum (*Indicum*) foliis simplicibus ovatis sinuatis angulatis serratis acutis.

* The natural time for the flowering of the Chinese Chrysanthemums is during the late autumn months; but some of the varieties blossom with us in October, and others are scarcely fully open till December; it may therefore be reasonably imagined that the skill of the Chinese, applied to accelerating the period of blossoming in the former case, and retarding it in the latter, may have effected in a great measure the extended period of flowering mentioned by Thunberg and Kæmpfer.

† *Species Plantarum,* edit. 2. vol. ii. p. 1253.

Matricaria

Matricaria Sinensis, minore flore, petalis et umbone ochroleucis. *Pluk. Amalth. p.* 142. *tab.* 430. *fig.* 3. (erroneously printed *fig.* 2.)

Matricaria Sinensis. *Rumph. Amb. vol.* v. *p.* 259. *tab.* 91. *fig.* 1.

Tsjetti-pu. *Rheede Mal. vol.* x. *p.* 87. *tab.* 44.

β. *Chrysanthemum Madraspatanum*, oxyacanthæ foliis cæsiis ad marginem spinosis, calyce argenteo. *Pluk. Alm. p.* 101. (*Phytographia*) *tab.* 160. *fig.* 6.

Matricaria Indica, latiore folio, flore pleno. *Moris. Hist. vol.* iii. *p.* 33.

Matricaria Sinensis, flore monstroso. *Vaill. Act.* 1720. *p.* 285. (printed 368 in the *Species Plantarum*). *Flora Zeylan. num.* 421.

Matricaria Zeylanica hortensis, flore pleno. *Raii Suppl. p.* 224.

I shall examine each of the above quotations and synonyms in the order in which they occur.

Plukenet's *Amaltheum* (his works were published some a little before, and others soon after the beginning of the eighteenth century,) gives no further description of his plant than appears in the quotation: but from the figure it may be observed, that the leaves are like those of our Chinese Chrysanthemums, though but slightly indented: that the flowers are produced from the sides as well as the ends of the branches; that they are very small, the rays and disc (as mentioned in the description) being yellow. Although the disc is noticed in the description, in the figure the flowers are represented as fully double, and consequently without any apparent disc.

Rumphius's *Herbarium Amboinense* was published in the year 1750 by John Burmann. It is a description and account of plants collected in Amboyna and the adjacent islands. The account

count of the *Matricaria Sinensis** is, that it was introduced from China, where it is known by the name of *Kiok-hoœ*, but that it is called by the Malays *Serune;* that its natural time of flowering in China is May and June, which being the rainy season in Amboyna, prevents the flowers from opening well, and that from October to April the plant is without flowers. It is stated further, that the Chinese cultivate it in pots, keeping it dwarf, and allowing only one flower to blow, but that in their gardens it does not succeed well, degenerating and perishing in two years. The figure represents the leaves like those of our Chinese Chrysanthemums, and the flowers double and very small. The plant is described as having a small root creeping under the ground, and throwing up suckers, though it is propagated by cuttings, in order to obtain larger flowers. Five varieties are mentioned, but the three last are said to be only known in China: the two first were cultivated in India; one of these has a white, the other a yellow flower. The white grows from two feet to two feet and a half high, with brittle branches, its leaves being deeply cut, dark green, and underneath downy; but the upper leaves are different in shape; the flowers globular, of the shape and size of a *Caltha* (a *Calendula*), with numerous white petals filling up the whole flower, except the centre, which shows a small yellow disc, and smells like Chamomile. The yellow variety is mentioned as having larger leaves, more elegantly cut, being more dwarf, and with flowers larger than the former. Of the three other varieties, the first was a flower similar to the two

* There are several points in the description and history of these plants of the *Herbarium Amboinense* that cannot possibly be applicable either to the small-flowering plants supposed to have been the real *Chrysanthemum Indicum* of Linnæus, or to those we call the Chinese Chrysanthemums. I am disposed to suspect that some confusion exists in the account, and that the characters of several plants have been mixed together.

preceding,

preceding, of a red colour, but which did not blossom well; the next had a greenish ash-coloured flower; and the blossom of the third was white; this last is said to be rare in China, where it is called *Tschy Saysi*, or the Drunken Woman, because the flowers at morning and evening hang their heads, raising them in the middle of the day, and following the course of the sun.

Rheede's *Hortus Malabaricus* is a work of much older date than the preceding, having been published in 1690. Rumphius considers his *Matricaria Sinensis* to be the same as Rheede's *Tsjetti-pu*, which is its native name in Malabar: the Portuguese call it *Alosna de Botao;* it is described as growing in sandy places, and having an aromatic odour; its branches being round, woody, and green; its leaves deeply cut into oblong narrow laciniæ, underneath very hairy, and greenish-white; having from two to four flowers rising above the branches, with green ligulate florets and a small yellow disc. According to the figure the plant has a branching stem with a central flower, leaves like the Chinese Chrysanthemum, but not deeply lobed, and the flowers small like a Chamomile; they are represented as quite double.

The whole description of the plant of Plukenet's *Almagestum*, which he calls *Chrysanthemum Madraspatanum*, is given in the quotation: the plant, according to the figure referred to, has leaves which are but slightly lobed, and small double flowers; it was communicated to Plukenet by Mr. Du Bois, a merchant who greatly assisted the botanists of his time by means of his connections with foreign countries, and particularly with the East Indies.

Morison's General History of Plants, the third volume of which was published by Bobart in 1699, gives the plant described in Linnæus's quotation solely on the authority of the *Hortus Malabaricus*, referring to the *Tsjetti-pu* of that work.

Vaillant's paper in the History of the Royal Academy of Sciences

ences

ences at Paris, which is quoted, is an enumeration of Corymbiferous flowers; he mentions two varieties of the plant referred to; the first is that of Plukenet's *Amaltheum* above mentioned; the second (which is the plant especially quoted) is a double-flowering one, noticed in the Catalogue* of Petiver's Museum, published in London in 1695, as a specimen existing in it, and there called *Matricaria Madraspatana, flore pleno flavescente.*

The *Flora Zeylanica*, which was published by Linnæus in 1747 (the reference to which follows that to Vaillant's paper), makes two varieties, after the example of that writer. The α, or the first, is the second variety of the *Species Plantarum*, and being a double flower, is also referred to the plants of Vaillant, of Morison, of Ray's History (noticed below), of Petiver's Museum, of Plukenet's *Almagestum*, and to the *Tsjetti-pu* of the *Hortus Malabaricus*. The *Var.* β is Vaillant's first variety, and is referred to that as well as to the plant of Plukenet's *Amaltheum.* Linnæus, in the description of these varieties, seems to have misplaced them by putting the double-flowering one as the type; he changed this arrangement in the *Species Plantarum*, the α of the *Flora Zeylanica* being the β of the *Species Plantarum*, and the variety β being the α. In addition to the quotations in the work which are mentioned above, and which I have placed together, because they are all referred to in the *Species Plantarum*, there is for the variety α, a reference to the *Matricaria flore pleno magno* of Hermann's *Museum Zeylanicum*†, and of Burmann's *Thesaurus Zeylanicus*‡; the former work being Hermann's Catalogue of his own Herbarium, collected by himself in Ceylon; the latter is a more general catalogue of Singhalese plants, founded on another Herbarium of Hermann's as well as on other collections. Besides the references, Linnæus gives the following short description of his plant:

* Museum Petiver. p. 76. no. 786. † page 33. ‡ page 153.

Caulis

Caulis herbaceus, erectus. *Folia* simplicia, cordata, sinuato-multifida, incisa, petiolata (*Artemisiæ facie*). *Flores* ramos terminantes, calyce imbricato squamis margine membranaceis, ut in *Chrysanthemis*. *Corolla* plena.

The plant of Ray's Supplement to, or third volume of, his *History of Plants*, published in 1724, is described from a specimen communicated to him by the celebrated botanist Dr. William Sherard; it had double flowers, the upper leaves being narrow, oblong, and entire; the lower leaves trifid. Ray gives no reference to other authors.

These are all the descriptions and references quoted by Linnæus. It may, I conceive, be considered that, of his two varieties, the α was supposed to have a single flower, and the β a double flower; and I doubt much if he contemplated any other important difference between them. Of the authors quoted, Morison, Vaillant and Ray have little weight in the point to be settled, for they can scarcely be considered as original describers; and to the plants of Rumphius and Rheede, which are not noticed in the first edition of the *Species Plantarum*, I am not disposed to attach much importance in the consideration of the question, their accounts in many points being quite discordant with the plants to which they are referred. By the figures and characters of Plukenet, and by Linnæus's own description of the plant in the *Flora Zeylanica*, in concurrence with the specific character given in the *Species Plantarum*, the question must be principally settled. With these views, I conceive that, giving proper weight to each of the preceding details, though there are some differences which prevent perfect accordance, it may be fairly deduced that the plant which Linnæus intended to describe as *Chrysanthemum Indicum*, had leaves much resembling those of the Chinese Chrysanthemums, but that its flowers were small, with

with short radial florets, which in most of the cases cited were yellow; and that the flowers, whether single or double, considerably resembled in their general appearance those of the common Chamomile or the Feverfew, and consequently were very unlike those of the Chinese Chrysanthemums.

The Linnæan Herbarium being in the possession of our President Sir James Edward Smith, he has kindly and liberally intrusted me with the examination of the original specimens, from which, as appears by notes attached to them, the character of the *Species Plantarum* was formed; I am thus fortunately enabled to elucidate more distinctly the differences which I have pointed out between the two plants. The specimens are two branches, both with single flowers, probably distinct varieties, the one having shorter footstalks and more finely-pointed serratures to the leaves than the other. The leaves, though having a great similarity to the Chinese Chrysanthemums, stand closer together, and are also smaller than in any of the varieties we know. The flowers are very small, the radial florets of that with long footstalks extending about a quarter of an inch only beyond the calyx; in the other specimen they do not exceed the length of the calyx; part of the flosculi of the disc of the first of these has been removed, and shows clearly that the receptacle is naked, or free from paleæ; this is a very important circumstance to have ascertained. Besides these two specimens, there is a third on the same paper; it is a small piece of a branch, or scarcely more than a footstalk, with a double flower, the expansion of which is near an inch and a half; by being placed on the same paper, it was of course considered by Linnæus as his variety β; but it is too imperfect to lead to any decided conclusion: it does not resemble any of the figures quoted by Linnæus, nor does it agree with the descriptions he has referred to, and might certainly be taken for a small flower of a Chinese Chrysanthemum.

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In addition to this evidence from the Linnæan Herbarium, there are two Herbaria in the invaluable collections procured by the late Sir Joseph Banks (whose unremitting zeal in the service of science, and endeavours to promote all that was good and useful for the benefit of mankind, will be remembered with gratitude by those who had the happiness to possess his friendship, and by all who have the real interest of science at heart), which, by the assistance they afford in this inquiry, are a proof of the peculiar utility of the preservation of well attested specimens. The first is an Herbarium formerly the property of Hermann; in it the identical specimens on which his *Thesaurus Zeylanicus* was formed are contained, being also the specimens which passed under the eye of Linnæus when he compiled the *Flora Zeylanica*. The specimen of the *Chrysanthemum Indicum* has small double flowers, and thus the precedence of the double variety in the *Flora Zeylanica* is in some measure accounted for; it is in three distinct pieces, two being flowering branches, and the third part having leaves only, probably all gathered from the same plant, which appears to have grown with vigour; and, except in the impletion of the flowers and greater size of the branches and leaves, accords in character with the Linnæan specimens. The other Herbarium is a volume of plants which belonged to Plukenet, and which contains three specimens deserving notice, as they all tend to elucidate this inquiry. The first is at the upper part of page 117 of the volume; it has been ticketed by Dr. Solander as *Chrysanthemum Indicum*, and by a note in old writing attached to it, is made the *Matricaria Sinensis* of the *Amaltheum*, which is quoted by Linnæus for his *Chrysanthemum Indicum;* it is as near as possible the same (only that it is double) as Linnæus's specimen, which I distinguished as having short footstalks. Another specimen, at the bottom of the same page, has been ticketed as *Chrysanthemum dubium* by Dr. Solander,

der, not being accompanied by any other note: it does not seem to agree with any plant described by Plukenet; it is only a small specimen with but one flower, very much like the imperfect specimen I have mentioned of the Linnæan Herbarium. The third specimen is of considerable importance; it occupies the whole of page 116 of the book; by a note in the same old writing above cited, it is referred to the *Matricaria Japonica maxima, flore multiplici flavescente, Shamunty Malabarorum* of the *Amaltheum*, page 142, which is not quoted by Linnæus, though it immediately precedes the *Matricaria Sinensis*, which he makes a synonym of his *Chrysanthemum Indicum*; he therefore, I imagine, did not think it belonged to this plant. The specimen is more like a Chinese Chrysanthemum* than any thing hitherto noticed; and if the note referring it to the *Matricaria Japonica maxima* be correct, we have a synonym probably referable to our Chinese Chrysanthemum, not adopted by Linnæus for his *Chrysanthemum Indicum*, though it had come under his observation. No specimen of the *Chrysanthemum Madraspatanum* of the *Almagestum* is to be found in this book.

If the omission of a reference to Plukenet's *Matricaria Japonica maxima, flore multiplici flavescente*, as above stated, can be considered any evidence that Linnæus did not consider it referable to his *Chrysanthemum Indicum*, the passing over another plant of the same author will be decisive of the question of difference in the mind of Linnæus; for there can be no doubt that this latter is actually a Chinese Chrysanthemum. The plant I allude to is thus described at page 243 of the *Almagestum*:

* It will be very desirable that this plant should, if possible, be obtained from China; it has flowers of a moderate size, not quilled, and fully double, similar to the Rose or Buff Chinese Chrysanthemum, with particularly short footstalks, by which the flowers appear imbedded in the leaves; and they grow from the alæ of the leaves, lower down on the branches than in those varieties now in our gardens.

"*Matri-*

"*Matricaria Japonica maxima*, flore soseo, seu suave-rubente pleno elegantissimo. *Breyn. Prod.* ii. 66. *Kychonophane Japonensibus dicta*, &c." The work of Breynius, from whence this plant is quoted by Plukenet, was published in 1689, and is entitled *Prodromus Plantarum rariorum secundus, exhibens Catalogus Plantarum rariorum anno* 1688 *in Hortis celeberrimis Hollandiæ observatarum.* At page 66 of this book are mentioned two plants, viz. *Matricaria Japonica flore minore albo simplici*; and, *Eadem flore pleno*, both sent to Breynius by Von Rhyne, the Governor of the Cape of Good Hope. These were probably plants of Linnæus's *Chrysanthemum Indicum* with single and double flowers; they are both quoted by Ray*, distinct from his *Matricaria Zeylanica* (which is the one Linnæus refers to), and he seems to consider the double one to be the same plant as that of Petiver's Museum before noticed. Sherard appears to have been of opinion that it was actually the same as the *Matricaria Zeylanica*, and there is little doubt but that he was right: if so, both these ought to have been quoted by Linnæus for the α and β of his *Chrysanthemum Indicum.* These are followed by an account and description, which I shall give in the words of Breynius himself†:

"*Matricaria Japonica maxima, flore roseo, sive suave-rubente pleno elegantissimo, nobis. Kychonophane Japonensibus. Corymbosarum* radiatarum omnium formosissima planta, atque Japoniæ insigne decus, minus fœtet, quam *Matricaria vulgaris*, inque humanam ferme altitudinem fruticis ad instar procrescit, multis ramis: *foliis* majoribus, nec non multo longeque latioribus: *floribus* in ramulorum et caulis summo,

* Ray, *Suppl.* page 224.

† This plant is also introduced by Ray into his Supplement, and is in the page of that work above referred to; and in the same page is the *Matricaria Zeylanica* which Linnæus quoted: so that there can be no doubt that this plant of Breynius must have been under his notice.

 plerumque

plerumque solitariis. *Rosæ* amplitudine, petalorum sesquiunciam longiorum, culmum latorum, in extremo frontatorum, suave-rubentium multiplici fœtu luxuriantibus, qui tamen in medio, luteum discum parvum, haud sine jucundissimo aspectu, et singularem huic plantæ gratiam conciliantem, commonstrant. *Semina* solida, vulgaris majora. Variat, floribus suave-rubentibus, candidissimis, purpureis, luteo-obsoletis, carneis atque phœniceis."

This is without doubt a description, by an author of great reputation, of six varieties of our Chinese Chrysanthemums existing in the Dutch gardens upwards of one hundred and thirty years ago, and yet not referred by Linnæus to his *Chrysanthemum Indicum.* In the above account it is stated that they bore seeds, which circumstance has not been even observed since their more recent introduction into Europe. It is singular that those plants of Breynius have not been referred to by any old author, except Ray and Plukenet; and amongst the modern writers, the only one who paid the least attention to them is Curtis, who, in the *Botanical Magazine, no.* 327, in describing the Purple Chrysanthemum, quotes the *Matricaria Japonica maxima* of Breynius, but he even does it with a mark of doubt.

When I first entered into the preceding inquiry, I little expected that it would have occupied so large a space; but the intricacy in which I found it involved has obliged me, in order to elucidate it completely, to extend my investigation of the subject to some length: I trust, however, that my purpose will have been answered. I think it clear that the two varieties of Linnæus's *Chrysanthemum Indicum,* and all the plants of the authors cited by him, whether the same as his plants or not, have very small flowers, and therefore to be distinguished from those plants with large flowers, now called Chinese Chrysanthemums, and which

which appear to have been known in Holland many years before they became objects of attention to modern gardeners. I cannot conceive how plants so easy to cultivate could have been lost; but no trace of them existed in the Dutch gardens when they appeared again in Europe. The modern writers, who have considered the whole as belonging to one species, have erred in treating them as actually the same, Persoon* alone excepted; he has avoided this error by keeping the Purple Chinese Chrysanthemum (the only one he knew) distinct from the plant of Linnæus, though under the same name, seeming to be of opinion that the great difference between them was effected by skilful cultivation.

Having distinguished the plants, I shall leave the determination of the true generic character and specific identity to the future investigation of some one more practised in botanical disquisition than myself, trusting that the result of the present inquiry will be the speedy introduction from India, in a living state, of those plants which have been described by the older writers, but which are not at present in the gardens of Europe. That they exist in China is ascertained by the Herbarium of Sir Joseph Banks, now in the possession of my friend Mr. Robert Brown, in which are many different specimens, all arranged as varieties of *Chrysanthemum Indicum*, which were brought from China by the late Sir George Staunton, when he accompanied Lord Macartney's Embassy to Pekin; some of these are of different kinds of Chinese Chrysanthemums; others are of the plants with small flowers (some single, some double), which I consider to be the *Chrysanthemum Indicum* of Liunæus; one of these with double flowers exactly resembles the specimen in Plukenet's Herbarium referred to his *Matricaria Sinensis*. Mr. Lambert has a specimen from China, corresponding with this latter, also having

* *Synopsis Plantarum*, vol. ii. page 461.

double

double flowers, which, having been examined, is ascertained to be without paleæ in the receptacle; and this circumstance strongly militates against the opinion that the paleæ on the receptacle of the Chinese Chrysanthemums are the effect of the impletion.

Among the specimens in the Banksian Herbarium, Mr. Brown has pointed out to me one with small single flowers (and with a naked receptacle), which may, I conceive, be considered as the *Chrysanthemum Indicum* of Linnæus: it is from China, but not one of those brought by Sir George Staunton. This specimen is in a very perfect state: a sketch of it has been engraved and published in the *Transactions of the Horticultural Society* (vol. iv. plate 12.) together with a copy of a coloured drawing (vol. iv. plate 13.) belonging to the East India Company, which I conceive represents the *Chrysanthemum Indicum* of Linnæus in a double state.

XXV. *Account of the Marmots of North America hitherto known, with Notices and Descriptions of three new Species. By Joseph Sabine, Esq. F R.S. &c.*

Read January 15, 1822.

In a collection of Natural History, received in England at the end of the year 1820 from Captain John Franklin, of the Royal Navy, the Commander of the Expedition sent over land to ascertain the position of the mouth of the Copper Mine River, and to explore and examine the Northern Coasts of the American Continent, were specimens of three new species of the genus *Arctomys* or Marmot.

The whole collection had been made by Dr. John Richardson and Lieutenant Robert Hood (who accompanied the Expedition), partly in the neighbourhood of Cumberland House, where the party passed the winter of 1819-20, having left York Fort on Hudson's Bay in the preceding autumn, and partly in an excursion made to Carlton House in the succeeding month of May. Cumberland House is a principal station in the interior of the country belonging to the Hudson's Bay Company, about 450 miles in a direct line south-west of York Fort; and Carlton House, also a station of the Company, lies nearly south of the former, being about 150 miles distant from it. Soon after the collection was received, it was placed in my hands by the direction of the Right Honourable the Earl Bathurst, the Secretary of State, with a request that I would prepare a scientific description

tion of the different specimens, and communicate the same to the Linnean Society. After the descriptions and account should be completed, the specimens were directed to be placed in the British Museum.

Quadrupeds and Birds form the chief part of the collection. Of the former, there are specimens of twelve different animals, most of them in a very perfect state, and affording excellent illustrations of that department of the zoology of the arctic countries of the New Continent. Of the Birds, there are specimens of above forty species, well preserved; nearly every one of them will supply some novel information to the ornithologist; a few are particularly interesting, from being hitherto unknown, or very imperfectly described.

The examination of the three undescribed Marmots led me into an investigation of the other species of the genus, hitherto known as natives of North America; and as I found that the published descriptions of them were in some instances obscure, and in others incorrect, I was induced to draw up this communication, conceiving that a more accurate account of the whole, as far as the means I possessed enabled me to prepare it, might not only be generally useful, but serve also to illustrate my descriptions of the new species.

The Marmots were placed by Linnæus in his genus *Mus;* they were separated by Schreber, who took the specific name *Arctomys*, given by Pallas to the Bobac Marmot, as that of his new genus; which being adopted by Gmelin in his edition of the *Systema Naturæ*, has continued to be used by succeeding naturalists. The whole generic character is given by Illiger*; but to prevent the necessity of repetition in my descriptions, I will here enumerate the principal points in which all the species agree.

* Illiger *Prod. Syst. Mam. et Av.* xxxvii. p. 84.

The

The *mouth* small, and placed below; the *fore-teeth* long, narrow, and wedge-shaped, two in each jaw; the *grinders* five in the upper and four in the lower jaw, on each side; the *whiskers* on the cheeks and *long hairs* over the eyes directed backwards: the *nose* short, more or less blunt, and when described as sharp, only so comparatively; the *ears* short and small, sometimes so short that only the foramen appears, and then the animal so circumstanced has been described as without ears; the *body* long; the *tail* short and covered with hair; the *legs* short; the *fore-feet* with four, but in some species with five, and the *hind-feet* always with five toes; the *claws* more or less bent. The habits of all are supposed to be similar: they feed on roots, fruits and seeds, burrow in the earth, or live in holes of trees and rocks, and are probably all torpid in the winter; innocuous when wild, and gentle in confinement.

Several species of *Arctomys* have been described as inhabiting various parts of the globe besides that portion to which the present account is confined; the best known of these are *A. Marmota* (the Marmot of the Alps), *A. Bobac*, and *A. Citillus*. Four species have been enumerated by authors as natives of North America: of these *A. Monax*, though at first involved in difficulty, is now well known; *A. Empetra* is also free from all doubt; *A. pruinosa* is but imperfectly known; and *A. Hudsonius*, though described as a Marmot, belongs to another genus.

Of the three new species now to be recorded, I possess little information respecting the habits or manners. My notice of them therefore will be confined to the description of the specimens which the annexed figures will illustrate.

 ARCTOMYS

ARCTOMYS MONAX. MARYLAND MARMOT.

1. A. capite auriculato, rostro acuto, cauda elongata, corpore griseo, pedibus nigris.

Bahama Coney. *Catesb. Carol.* ii. 79.

Marmota Americana. *Catesb. Carol. App.* 28.

The Monax or Marmotte of America. *Edw. Nat. Hist.* ii. 104.

Cavia Bahamensis. *Klein. Quad.* 50.

Glis Marmota Americanus. *Klein. Quad.* 56.

Glis fuscus. Marmota Bahamensis. *Bris. Reg. Anim. edit.* 4*to*. 163.—*edit.* 8*vo.* 115.

Glis fuscus rostro e cæruleo cærulescente. Marmota Americana. *Bris. Reg. Anim. edit.* 4*to.* 164.—*edit.* 8*vo.* 115.

Mus Monax. *Linn. Syst. Nat. edit.* 10. 1. 60.—*edit.* 12. 1. 81. *Pallas Glir.* 74. *Schreb. Quad.* 737. *pl.* 208.

Maryland Marmot. *Penn. Syn. Quad.* 270. *Penn. Hist. Quad.* ii. 398.—*edit.* 3. 2. 130. *Penn. Arct. Zool.* i. 111. *Shaw's Zool.* iii. 117.

Le Monax ou Marmotte de Canada. *Buff. Hist. Nat.* xiii. 136. *Supp.* iii. 175. *pl.* 28. *Hist. Nat. par Sonnini* xxxii. 222. *Desmarest in Nouv. Dict. d'Hist. Nat.* xix. 134.

Glis Monax. *Erxl. Syst. Anim.* 361.

Arctomys Monax. *Gmel. Syst. Nat.* i. 142. *Turton Syst. Nat.* i. 89.

Monax. *Bewick's Quad. edit.* 1. 345. *cum figura.*—*edit.* 2. 368. *cum figura.*

Size of a Rabbit. *Face* light blueish ash-colour; *nose* rather sharp; *eyes* dark, slightly prominent; *ears* small and round; *whiskers* long and stiff, growing from the corners of the mouth. *Body* dark brown, paler underneath; *tail* half the length

length of the body, rather bushy, with dark brown hairs. *Feet* and *claws* black ; the latter long and sharp.

The description is formed from the characters and figures given by the different authors referred to ; I have not been able to obtain a specimen from which to correct it.

The animal inhabits the more temperate parts of North America, Pennsylvania, Maryland and Virginia ; and is also found in the Bahama Islands. It feeds on roots, fruits and vegetables. Lives under ground or in holes of trees, and is said to sleep during the winter season.

Catesby in 1743 described and figured this species as an inhabitant of the Bahamas ; his figure has much resemblance to a large Rat, and is certainly very unlike what the animal is represented really to be by subsequent authors. In the Appendix to his work it is again mentioned among the Quadrupeds of North America as a different animal. This mistake led Klein and Brisson to make two species, founded on the two accounts of Catesby. Erxleben united their references, and thus corrected their error.

Edwards in 1747, without a knowledge of Catesby's account, described the animal from a living specimen belonging to Sir Hans Sloane, and published a good figure of it, supposing it to have been previously unknown ; the colour of the body of this figure is probably too light. Linnæus formed his character of the species from Edwards, and did not refer to any other work in the 10th edition of his *Systema Naturæ ;* in the 12th edition he only added to his former account a description of the animal received from his pupil Alstrœmer.

Pennant in his *Synopsis of Quadrupeds* (the first edition of the work which he subsequently called a *History of Quadrupeds*), named the animal the Maryland Marmot, the one described and

 figured

figured by Edwards having been brought from that province to Sir Hans Sloane. Pennant referred to and adopted the accounts of Catesby as well as of Edwards.

Buffon at first confounded the Monax with the Marmot of the Alps. In the Supplement to his *Histoire Naturelle* he corrected this mistake, but still treated it only as a variety of that species. In his account of it in both instances he got into error, supposing it to be the Siffleur of Canada, which is the next species. Buffon's figure is said to be from a drawing sent him by Collinson; but it has so strong a resemblance to Edwards's figure, that it might be supposed to have been designed from that engraving, though the colour has more accordance with the figure of Catesby.

Schreber's figure is copied from that of Buffon; but in the colouring he has followed Edwards. Bewick's figure is copied from Edwards.

Arctomys Empetra. Quebec Marmot.

2. A. capite auriculato, rostro obtuso, cauda mediocri, corpore suprà vario, subtùs castaneo.

Quebec Marmot. *Penn. Syn. Quad.* 270. *pl.* 24. *fig.* 2. *Forster in Phil. Trans. vol.* lxii. 378. *Phil. Trans. Abr.* xiii. 329. *Penn. Hist. Quad.* ii. 397. *pl.* 41. 2.—*edit.* 3. ii. 129. *pl.* 74. 1. *Penn. Arct. Zool.* i. 111. *Bewick's Quad. edit.* 1. 346. *cum figura.*—*edit.* 2. 369. *cum figura.* *Shaw's Zool.* iii. 119.

Glis Canadensis. *Erxl. Syst. Reg. Anim.* 363.

Mus Empetra. *Pallas Glir.* 75.

Arctomys Empetra. *Schreb. Quad.* 743. *pl.* 210. *Gmel. Syst. Nat.* i. 143. *Turton Syst. Nat.* 1. 89.

Marmotte de Quebec. *Desmarest in Nouv. Dict. d'Hist. Nat.* xix. 314.

Length

Length from the nose to the insertion of the tail twenty inches. *Nose* blunt and dark; *hair* on the *cheeks* and *chin* short, inclining to grey, on the *top* of the *head* dark brown; *ears* short, round, rather bare, appearing above the hair of the head; *cheeks* not much puffed; the *whiskers* as well as the *long hairs* growing over the eyes stiff and black; *upper fore-teeth* long and round, the *lower* longer and smaller. The whole *upper part* of the body nearly alike, the hairs being dark at their base, yellowish in the middle, and black at the top, with the tips white, but there is less appearance of the white towards the tail; *throat*, *legs*, and all the *under-parts* dark chesnut; *tail* six inches long, hair throughout dusky, without white tips, longer than on the back, darker at the end. *Toes* black, covered with short dark hairs; the *inner* ones on the hind-feet and the *outer* ones on the fore-feet shorter: rudiment of a *fifth toe* inside of the fore-feet; *claws* long and sharp, those on the fore-feet longest and more arched.

This description is from a specimen presented by the Hudson's Bay Company to the British Museum.

The animal was first described in 1771 by Mr. Pennant in his *Synopsis of Quadrupeds* from a living specimen; and subsequently in 1772, in the *Philosophical Transactions*, by Mr. John Reinhold Forster, from a specimen sent, with several other subjects of natural history, from Hudson's Bay by Mr. Graham, and deposited in the Museum of the Royal Society; but that specimen was only eleven inches, and the tail three inches long; it could not therefore have been fully grown. Pallas described the animal from a specimen in the Leyden Museum, and gave it the name of *Empetra;* this did not exceed a foot in length, and its tail was only two inches and a half long. It is the animal which the

the French Canadians are said to have called Siffleur, from the hissing noise it makes when disturbed, though Buffon supposed that name more applicable to the Maryland Marmot. It inhabits the country round Hudson's Bay, Canada, and other northern parts of America.

The figure given by Pennant in his *Synopsis of Quadrupeds*, and also in the second and third editions of his *History of Quadrupeds*, is small, and, though a tolerable representation, does not convey a good idea of the animal. This figure was copied by Bewick.

Schreber's figure was taken from a drawing communicated to him by Pallas; he makes the body a pale yellow, and the top of the head as well as the under-parts of the body chesnut; the tail is represented so short as not to touch the ground as the animal stands. The chesnut colour of the head is mentioned by Forster, and therefore is probably to be found in some instances, though on the specimen I have seen there is no such appearance.

ARCTOMYS PRUINOSA. HOARY MARMOT.

3. A. capite auriculato; rostro pedibusque nigris, dorsi laterum et abdominis pilis duris, longis, basi cinereis medio nigris, apice albidis. *Gmel.*

Hoary Marmot. *Penn. Hist. Quad.* ii. 398.—*edit.* 3. ii. 130. *Penn. Arct. Zool.* i. 112. *Schreb. Quad.* 745. *Shaw's Zool.* iii. 121.

Arctomys pruinosa. *Gmel. Syst. Nat.* i. 144. *Turton Syst. Nat.* i. 89.

Size of the Quebec Marmot, as described by Mr. Pennant; that is, the size of a Rabbit. *Tip* of the *nose* black; *ears* short and oval; *cheeks* whitish; *crown* dusky and tawny. *Hair* unusually rude and long; that on the back, sides and belly

Arctomys Franklinii.
reduced $^3/_4$

J. Curtis del. et sculp

belly cinereous at the root, black in the middle, whitish at the tip, so that the animal has a hoary appearance; *tail* black, mixed with rust colour. *Legs* black; *claws* dusky.

The above description is copied from the *History of Quadrupeds*. Our knowledge of this species is derived solely from the description of Pennant, which he made from a specimen in the Leverian Museum, and of which no figure was taken. The specimen was supposed to have come from the northern parts of North America. I have in vain endeavoured to trace the specimen; it was probably sold when the Leverian Museum was dispersed by sale, but I have not been able to ascertain by whom it was purchased.

The Quadruped* which was described by Mr. Pennant under the name of Tail-less Marmot, and called *Arctomys Hudsonius* by Turton, has been considered by Dr. Shaw to belong to the genus *Hyrax;* it certainly is not an *Arctomys*. Nothing more is known of the animal than that the specimen of it described by Pennant and figured by Bewick was in the Leverian Museum.

Arctomys Franklinii. Grey American Marmot.

A. capite auriculato, rostro obtusissimo, cauda elongata, corpore fuscescente vario.

Tab. XXVII.

Size of a large Rat; eleven inches from the nose to the insertion of the tail. *Face* broad, nearly covered with rigid grey (black and white) hairs; *nose* bare and very blunt; *ears* broad,

* Tail-less Marmot. *Penn. Hist. Quad.* ii. 405.—*edit.* 3. ii. 137. *Penn. Arct. Zool.* i. 112. *Bewick's Quad. edit.* 2. 374. *cum figura.*
Arctomys Hudsonius. *Turton Syst. Nat.* i. 90.
Hyrax Hudsonius. *Shaw's Zool.* ii. 225.

broad, covered with short hairs; short black *whiskers* on the cheeks, and similar hairs grow thinly distributed above and below the eyes; *throat* dusky white; *upper fore-teeth* short and reddish-yellow; *lower fore-teeth* twice the length of the upper, and paler. *Upper part of the body* with short hairs, dark at the base, in the middle dingy white, then first black, next yellowish-white, and tipped with black, the whole a variegated dark yellowish grey; the hair on the *sides* is longer, has less black, and is without the yellow tinge; that on the *belly* is dark at the base and dingy-white above; *tail*, to the end of the hair, five inches long, with long hairs banded with black and white and tipped with white, the whole appearing indistinctly striped with black and white. *Feet* broadish; *toes* thin and grey, covered with hairs, on the fore-feet the second from the inside longest, the outer shortest and placed far back; the three centre hind-toes nearly of an equal length, the extremes shorter and far back; the *claws* horn colour, those on the fore-feet long and sharp, those on the hind-toes shorter.

This specimen approaches the *A. pruinosa* in some parts of the description, but is still so distinct in others, that I cannot suppose it to be a different state or age of that animal, or even supposing imperfection or error to exist in the description of *A. pruinosa*, that the two can be ever brought together as one species.

The name is given in compliment to the intrepid and spirited Commander of the Expedition, to which, from his perseverance in the arduous enterprise intrusted to his conduct, so much of interest is attached.

ARCTOMYS

Arctomys Richardsonii.

reduced 6/9

J. Curtis del. et sculp.

Arctomys Richardsonii. Tawny American Marmot.

A. auriculis brevibus, rostro acuto, cauda mediocri, corpore fulvescente.

Tab. XXVIII.

Nearly the size of the preceding but more slender. Top of the *head* covered with short hairs, dark at the base and light at the tips; *face* narrow; *nose* tapering and sharp, bare at the end, above covered with short light-brown hairs joining and mixing with those on the top of the head; *ears* oval and short; *cheeks* swollen, covered with light-brown hairs; *whiskers* short, growing from the cheeks, and a few long rigid hairs above the eyes; *throat* dirty white; the *fore-teeth* of the specimen were broken. Upper part of the *body* covered with soft short hairs, dark at the base, above fulvous; in the middle of the back the hairs are like those on the top of the head but lighter: sides with longer hairs, showing dark at their base when raised, the ends a smoky white, the under-parts similar, but a little dashed with ferruginous; *tail* three inches and a half long to the end of the hair, slender, and thinly covered with long hairs, which are at the base of the same colour as the body, but above of three distinct colours, first black, next dark, and lastly light at the upper extremity. *Legs* rather long and slender: *feet* narrow; *claws* horn-coloured, arched and sharp; on the fore-feet, withinside, a small toe, placed far back, with an obtuse claw; in having this it differs from the general character of the genus; outer toe and claw of the fore-feet much shorter than the remaining three, of which the middle one with its claw is longest. Of the *hind-toes*, the two extremes shorter and placed back, the other three nearly of the same length.

 The

The specimen was obtained at Carlton-House, was noted as a male, and as inhabiting holes in the ground.

The specific name is a tribute to the merits of Dr. John Richardson, who went out with the Expedition as a Naturalist, and to whose attention and care we are indebted for these additions to our zoological knowledge.

ARCTOMYS HOODII. STRIPED AMERICAN MARMOT.

A. auriculis brevissimis, rostro acuto, cauda mediocri, corpore supra striis parallelis alternatim fuscis albo guttatis.

TAB. XXIX.

Length about seven inches and a half from the nose to the insertion of the tail. Top of the *head* broad and flat, obscurely marked with alternate stripes of dark brown and dingy white; *nose* tapering and very sharp, covered with light brown hairs; *ears* small and very short; *cheeks* swollen, covered with dingy light hairs; longish *whiskers*, growing between the nose and the eyes, and similar rigid hairs over the eyes; *throat* dingy as the cheeks; upper *fore-teeth* short and thick; under much longer and narrower. The whole *upper part of the body* marked longitudinally with alternate dark brown and dingy white stripes; the dark stripes twice the breadth of the light, and dotted at even distances the whole length in their centre with small spots of dingy white; there is a dark stripe in the centre of the back, and it is rather broader than the others, of which there are three on each side; but the lowest on each side is not distinctly defined or spotted; the whole *under-parts* are of a dingy white, slightly fulvous; the *tail* is two inches long, indistinctly banded with dark brown and dingy white; the tip being of the latter hue. The *fore-legs* are short and small, covered with light hairs:

Arctomys Hoodii.

full size

J. Curtis del. et sculp.

the outer toe and claw small, and placed back; of the three other toes the centre is the longest; there is also a rudiment of a toe, with a small obtuse claw on the inside, but this is not so conspicuous as in the preceding species; the *hind-legs* are longer than the fore, and covered with light hairs; the extreme *toes* and *claws* of nearly equal length, placed back, and the three others also of equal lengths with each other; the *claws* are dark horn-colour, light at their end and small, the fore ones the longest.

In the name of this beautiful little animal, I am desirous of recording the zeal of Lieutenant Robert Hood. His application to the various matters of science which have offered themselves to the notice of the travellers well deserves to be thus recorded. His beautiful drawings and skilful delineations of the route of the Expedition, which were received at the same time with the specimens now described, are most satisfactory proofs of his ability.

October 29, 1822.—Captain Franklin, who returned in the present month, whilst the preceding pages were printing, having intimated his desire that an account of the subjects of Natural History collected by him during his expedition should accompany the narrative which he is preparing for the press, the descriptions of the collections alluded to at the commencement of this paper will form a part of that publication.

 XXVI. *On*

XXVI. *On certain Species of Carduus and Cnicus which appear to be dioecious.* *By Thomas Smith, Esq. F.R.S. and L.S.*

Read February 5, 1822.

ALTHOUGH Linneus founded his orders in the class *Syngenesia* upon nice distinctions, drawn from the various modes in which the florets of different sexes are arranged in each capitulum, the fact that many species were dioecious, or had the male and female flowers on distinct plants, almost entirely escaped his observation; for in the last edition of his *Genera Plantarum*, published in 1764, he remarks, that *Gnaphalium dioicum* is a rare example of the separation of the sexes in this class.

Jussieu in his *Genera Plantarum*, published in 1789, does not appear to have been aware of any other example than the above, for he observes at the end of his generic character of *Gnaphalium*, " Species una dioica insigni exceptione."

It has however been pointed out to me by my friend Mr. Brown, that at the time this observation of Jussieu's was published, Friedrick Ehrhart had shown that some species of *Tussilago* were dioecious: and our native species *Tussilago hybrida* and *Petasites* now rank as one only under the name of *Petasites*, which is the male, *hybrida* being the female*. Mr.

* Vide Friedrick Ehrhart *Beiträge zur Naturkunde,* vol. iii. 1788. The paper is however dated December 1783, and had previously been printed (I believe) in the *Hanover Magazine,* probably about the latter date.

It may be proper nevertheless to note, that M. Cassini, whose extended and accurate investigation of this class gives great weight to his opinion, has come to an opposite conclusion

Mr. Brown in his *Observations on the Compositæ*, inserted in the 12th volume of the *Transactions* of this Society, announced many more instances of this remarkable circumstance: it forms a part of his character of the genus *Baccharis*, which Richard and Jussieu had previously proposed to limit to such species as were dioecious, and which thus comprehending *Molina* of the *Flora Peruviana*, contains many species. The plants forming two of the new genera there proposed (*Petrobium* and *Brachylæna*) he has ascertained to be dioecious; another genus, *Piptocarpha*, he suspects to be so; and the dioecious *Gnaphaliums* (to which he shows that *margaritaceum* must be added) are also thrown into a separate genus.

It will be observed, that the greater part of the genera mentioned belong to orders which have florets of different sexes in the same capitulum; in such the prevalence of one sort of floret in all the capitula of a plant to the exclusion of the other is a circumstance not so unexpected as in the order *Syngenesia Æqualis*, where all are hermaphrodite; to this, however, *Petrobium* and *Brachylæna* are referable; and Mr. Brown's description (in the same paper) of the separation of the sexes in *Serratula tinctoria*, led me to notice the same circumstance in *Serratula*, or, as it is now most frequently called, *Cnicus arvensis*, and in some other species of the genera *Carduus* and *Cnicus*, all of which were supposed to have hermaphrodite flowers only.

So long ago as the year 1807 I had observed that there were many plants of *Serratula tinctoria* in which the antheræ were entirely abortive; but finding others in which all the organs were

conclusion to the above, and considers the two plants as distinct species. His words are: "Les styles du *Tussilago hybrida* différent assez du ceux du *T. Petasites*, pour demontrer, independamment de plusieurs autres argumens, que ces deux plantes n'appartiennent point à la même espèce, comme l'ont cru très mal-à-propos quelques botanistes modernes." *Journal de Physique*, tom. lxxvi. p. 191.

apparently

apparently perfect, it did not occur to me that there was any separation of sexes.

On re-examining this plant, in consequence of Mr. Brown's observations, the striking difference between the male and female flowers, which had formerly induced me to look for some specific difference between the plants bearing them, appeared to point out a very ready mode of examining the nearly allied species by the external appearance of their capitula without the labour of a minute dissection.

Looking at *Cnicus arvensis* with this view, I soon found that different patches of it had flowers which presented differences similar to those of the *Serratula tinctoria*, and dissection confirmed the external appearances; by the examination of very many specimens, I ascertained that some plants bore flowers the antheræ of which were invariably abortive, and that in others the ovaria as invariably withered without producing seeds.

A more detailed account of the differences between the male and female flowers is as follows.

The female florets are somewhat shorter and smaller than the male, particularly the laciniæ and dilated part of the tube of the corolla; hence the male capitulum, when in flower, appears much larger than the female. The part of the style which is bearded in the male is shorter in the female, and destitute of pili, except a very few at the base of the fissure; this fissure in the male opens but little; in the female it is very much opened, having the margins bent back and the apices recurved; the apex is divided in the male, but the apices are straight: the male capitulum is more oval, that of the female more cylindrical inclining to conical.

The part of the style which bears the stigma is waved in the female, straight in the male; in the female flat, bearing the stigma on the edges generally of a deeper purple than the lower part;

part; in the male compressed, cylindrical, of the same shade of colour as the part below it.

The male florets are more exserted beyond the scales of the capitulum, and therefore longer in proportion to it than the females, which frequently project very little beyond the scales.

It is not a little remarkable, that the separation of the sexes should have been so long overlooked in this unfortunately most abundant of weeds; the great difference in the appearance of the male and female flowers has not however passed altogether unnoticed, for Roth in his *Flora Germanica**, having described *Serratula* (our *Cnicus*) *arvensis*, says, "Variat primo calyce minori ovato oblongo floribus duplo majoribus pallidioribus, stigmatibus subbifidis erectis." This description, I think, there can be no doubt refers to the male plant.

It is I believe a common observation, that *Cnicus arvensis* rarely produces seed: and this circumstance has been attributed to its increasing so much by the root; the separation of the sexes however presents a much more satisfactory explanation: and I have mentioned before, that the plants of each sex grow together in large patches without intermixture; hence the chance of impregnation being effected is much diminished.

A useful economical application may perhaps be made of this fact, particularly if the observation of Villars in his *Histoire des Plantes de Dauphiné* be correct†: he says, that there is a simple means of destroying this plant, which is by permitting it to flower, after which it dies; if, however, it be cut down before flowering, it will increase in all directions. If the seeds were perfect, it does not seem that much could be gained by this plan: as however there is a great chance that they may not be so, should it be true that the plant dies completely after flower-

* Tom. ii. pars 2. p. 295.

† Tom. iii. p. 23.

ing, it may prove a safe and successful means of diminishing the quantity of this troublesome weed.

I have examined several others of our native species of *Carduus* and *Cnicus* in their wild state, and have found female plants in *Cnicus palustris*, *pratensis*, and *acaulis*. In *Carduus nutans*, *acanthoides*, and *tenuiflorus*, and in *Cnicus lanceolatus* I met with no deviation from the usual structure. *Carduus marianus*, which I saw in a garden only, was hermaphrodite, as was *Cnicus eriophorus* in the same place. *Cnicus tuberosus* and *heterophyllus*, which I have also only seen cultivated, were both female plants; and the figure of the latter, given by Professor Hooker in the *Flora Londinensis*, is manifestly a female. In the Herbariums specimens of both species occur with perfect antheræ.

Of *Carduus nutans*, *acanthoides*, and *tenuiflorus*, which I have mentioned as having hermaphrodite flowers only, it should be noticed that I have seen very few of the first; of the other two indeed a considerable number, but all growing in one spot. *Cnicus lanceolatus* is everywhere too obvious to leave any doubt respecting it.

Cnicus palustris. Having examined a considerable number of specimens, the female plants I find are not numerous, and bear but a small proportion to the antheriferous. The difference in external appearance between the female and the antheriferous flowers is not so great or obvious as in some other species; the florets are of the same size, but the antheriferous ones expand more, and the anthers project far beyond the laciniæ of the corolla; the style is at this period much longer than it ever is in the female; this is distinguished by the small abortive antheræ, which not rising beyond the little expanded laciniæ of the corolla, are scarcely seen, while the projecting styles have their stigmata more developed and a little waved.

Cnicus pratensis I have seen in abundance only in one situation

on

on Ashdown Forest, near Withyham in Sussex: here both the female and antheriferous plants were growing, but in separate patches: in two other spots in the same neighbourhood, where there was not a great quantity, I found only antheriferous plants.

Cnicus acaulis I have seen growing abundantly, and the female plants seemed to be as frequent as the antheriferous.

In examining exotic species, I was generally reduced to a single plant of each; and supposing it to be dioecious, it was probably an equal chance whether it was a male or a female: if a female, it was readily known by the imperfect antheræ: but it was not so easy to distinguish a male from an hermaphrodite: this I attempted to do by examining the capitula, which had flowered; and when all the ovaria proved abortive, I concluded that the plant was a male.

I am aware, nevertheless, that this is a very doubtful test in a cultivated plant, the flowers of which are frequently barren from causes that are not obvious.

By the kindness of Mr. Anderson I was enabled several times to examine the numerous species of the genera *Serratula*, *Carduus*, and *Cnicus*, which are cultivated in the Botanic Garden at Chelsea; and about half the plants to which, from the state of their flowering, I could apply the tests above mentioned, proved either male or female.

In *Serratula*, the only species not hermaphrodite was the *tinctoria*.

In the genera *Carduus* and *Cnicus* I ascertained the following, as named in Mr. Anderson's manuscript catalogue, to be female plants.

Cnicus tuberosus, *ochroleucus*, *semipectinatus*, and *Salisburgensis*.

Three or four others I suspect to be male plants; for, upon examining many capitula that had flowered, I could not find any perfect seeds.

I have looked over the specimens of *Carduus* and *Cnicus* in the Banksian Herbarium, and the following appear to be female plants:

Carduus rivularis, Chius, rigens, serratuloides, paniculatus. Cnicus leucocephalus, rigens, Erisithales, tuberosus, acaulis, oleraceus.

There are specimens of both sexes of *Erisithales* and *acaulis*; the specimen of the female plant of *acaulis* is remarkably distinct from the male.

Since I first turned my attention to this subject, a doubt has arisen whether in many, perhaps in most of the cases in which female plants occur, the antheriferous plant may not be an hermaphrodite rather than a male.

The plant which I first ascertained to be dioecious was *Cnicus arvensis*: in this the separation of the sexes is undoubted and unequivocal; for though I have examined a very great number of male plants, the ovaria have always proved abortive, except in one instance, in which two of the ovaria in one capitulum were most decidedly impregnated, the embryo being so far advanced that no doubts could be entertained about it: the stigmata of these flowers did not, however, appear to differ from those of the numerous unimpregnated ovaria which surrounded them: this case must therefore be considered as merely accidental.

Having ascertained that this species was dioecious, I concluded that all the others were so in which female plants were to be met with; but, in some, hermaphrodite plants certainly occur, nor have I been able to detect any males amongst these. It is not easy to distinguish between the hermaphrodite and the male; the only unequivocal test of the latter seems to be, that the antheræ should have perfect pollen, and that the ovaria should be abortive; two states of the flowers which it is rather difficult to meet with on the same plant at the same time.

The stigma does not supply a distinction sufficiently decisive; for

for although, when the stigma of the female flower is compared with that part in the antheriferous one, a much greater development is perceived in the female, still in the former it is apparently sufficiently developed for the purposes of impregnation: hence it is not possible, from seeing a few plants with perfect antheræ, to say whether the species is dioecious or not; it can only be determined by an examination of numerous specimens.

There is another source of error: In *Cnicus pratensis* the antheriferous plants which were growing near the females had when gathered the appearance of being males; but having kept them for some days and noticed the progress of the development of the different parts of the flower, it was seen that, when the pollen of a particular flower was entirely dispersed, the stigma became developed nearly as much as in the female flower, although while the style remained covered with pollen it was merely indicated by a line, which induced the idea that the plant was a male: I afterwards found also the antheriferous capitula impregnated, except the florets of the ray, the stigmas of which were not developed nor the ovaria impregnated: whether this is constantly the case, remains for future inquiry.

Neither in *Cnicus palustris* nor in *acaulis* have I ascertained that male plants exist; in *palustris*, from the numerous specimens examined, I should conclude that they do not, and that this plant therefore consists of hermaphrodites and females, the former being the most numerous.

In another plant of the *Carduaceæ*, equally common with *Cnicus arvensis*, I have also found female plants; this is the *Centaurea nigra;* but I have not found any that can be called males, as those plants in which the anthers are perfect have perfect seeds.

The female and hermaphrodite (as it must be called here) differ as the male and female do in *Cnicus arvensis*. The female

 florets

florets are smallest; they project but little beyond the involucrum; their laciniæ are but slightly divaricate; their imperfect antheræ do not rise above the apices of the laciniæ of the corolla; their filaments are never visible: in the hermaphrodite the stamina project so much, that at the period of their full vigour the filaments are seen above the tube of the corolla. These differences are less obvious after the flowering is past; for, the stamina being retracted, the hermaphrodite is much more like the female: as to numbers, the hermaphrodite is the most prevalent.

In *Serratula tinctoria*, in which Mr. Brown first pointed out the existence of female plants, I have not been able to satisfy myself that males are to be met with; for in the antheriferous plants I have always found the ovaria impregnated. The seeds of the female differ in being larger than those of the hermaphrodite. In this species plants occurred which showed a regular gradation from the female to the hermaphrodite; in one, the antheræ were much smaller, shorter, and more imperfect than they most frequently are found in the female; in another they were as much larger, projecting, and embracing the style as in the hermaphrodite, but containing only a few grains of abortive pollen.

The numbers of the female and hermaphrodite are nearly equal. The stigma of the female is developed very soon after the flower opens; in the hermaphrodite, on the contrary, it does not appear until the pollen of its own antheræ is dispersed, the style remaining undivided to the apex till this period; the aid of the antheræ of some adjoining flower consequently becomes necessary for the purposes of impregnation.

This is a striking example of a mode of impregnation which, according to M. Cassini, prevails nearly throughout the whole family of the *Compositæ*, and which renders the presence of two flowers at the very least necessary to the impregnation of either; constituting,

constituting, in fact, a species of monoecious inflorescence; and as it requires some external aid for its completion, forms a transition to the decided separation of the sexes in distinct florets, which are further removed into distinct capitula in the monoecious genera *Xanthium* and *Ambrosia*, and still further in the dioecious plants.

This process is analogous to that which takes place in a few instances in the animal kingdom, in what are on this account termed androgynous animals, of which the *Helix hortensis* is a well known example. In the androgynous animal, although it has both the male and female organs complete, the one cannot be impregnated by the other on account of their relative position: in the androgynous flower, impregnation is prevented by the organs of the two sexes not being developed at the same time.

I am not aware that any particular term has been adopted to designate flowers of this kind; but as they are not confined to the family of the *Compositæ*, it might be useful to point them out by an appropriate name, and *androgynous* seems strictly applicable. Linnæus has indeed used the term *Flos androgynus*, but it is not, I believe, known what precise meaning he intended to convey by it; from which cause it has fallen into disuse.

It being a matter of some interest to ascertain what proportion of the species of the genera I have mentioned, or of those allied to them, have the male and female flowers on different plants; and as this can only be effected by examining numerous specimens in their wild state, it may be useful to point out some of the most obvious and striking distinctions between the female and antheriferous capitula, and which are such as may be readily observed in a cursory survey of the plants: to determine whether the flowers are male or hermaphrodite, recourse must be had to the seeds.

The

The flowers of the antheriferous capitulum are much larger, and the laciniæ more divaricate, the perfect antheræ rise beyond the laciniæ and embrace the style; in the female the abortive antheræ scarcely appear beyond the tube of the corolla, and, being generally very small, are not seen except upon a close examination: this gives the female capitulum a uniform colour and appearance, which is destroyed in the antheriferous one by the projecting of the antheræ, frequently of a different shade of colour from the corolla, and which, even when withered, remain exserted nearly to the tips of the laciniæ, producing a ragged and discoloured appearance.

The stigma of the female is almost always much more developed, and in general somewhat waved; it is very remarkably so in the female *Serratula tinctoria*.

In *Cnicus arvensis* there is another circumstance which distinguishes the sexes even after flowering, and which is perhaps more striking than any other; this is produced by the pappus. In the female, the pappus at the time of flowering is shorter than the tube of the corolla, and nearly as long as the scales of the involucrum; after flowering it lengthens very considerably, and, when the seed is ripe, is twice its former length, and entirely conceals the persistent corolla: when the seeds are to be dispersed, the female plants are white with the large and abundant pappus, which appears projecting beyond the scales of the involucrum before it is discharged by their expansion.

In the male, the pappus at the time of flowering is nearly of the same length as in the female: it however never increases afterwards, and is concealed after flowering by the withered corolla and antheræ: at this period, therefore, the male plants are distinguished by the brown withered capitula, which appear generally to perish without discharging their abortive seeds and useless pappus.

My

My observations have not been sufficiently extensive to enable me to say whether this lengthening of the pappus is a very unusual occurrence; but I suppose it to be so from the following remark of M. Cassini, the universal application of which must be modified by the fact which I have mentioned: "L'aigrette ne prend aucun accroissement après la fleuraison, même dans le cas où l'ovaire des synathérées grandit beaucoup après cette époque*."

The figures of these plants are not in general delineated with sufficient attention to detail, to show whether they are taken from a male or a female specimen; in some cases, however, there is little room for doubt, as in Professor Hooker's figure of *Cnicus heterophyllus*, to which I have already referred.

Cnicus palustris, *English Botany*, *pl.* 974, and *Cnicus acaulis*, *Flora Danica* 1114, are certainly antheriferous plants.

The figures of *Cnicus arvensis* in the *Flora Londinensis* and in *English Botany*, *pl.* 975, are females; but the figure of Fabius Columna in his *Ecphrasis*, i. 46. (the first probably ever executed of this plant) is remarkable for its great accuracy, showing clearly that it is a male: and exhibiting moreover the elongation of the pappus in the female after flowering, by a comparative view of it as attached to a floret and to a seed; a circumstance unnoticed by others, even where the seed has been delineated with the pappus.

* *Journal de Physique*, tome lxxxv. p. 17.

XXVII. *The*

XXVII. *The Natural History of Lamia Amputator of Fabricius.*

By the Rev. Lansdown Guilding, A.B. F.L.S. &c.

Read March 5, 1822.

No apology, I conceive, will be thought necessary for offering to the notice of the Linnæan Society the natural history of a single species of the interesting family of *Cerambycidæ*, which, in its earlier stages, has never been described by the entomographer.

Of all the coleopterous insects destined to accelerate the decay of timber, there is no species perhaps whose habits are more singular than those of the insect whose history is here detailed. The *Imago* has long since been described by Fabricius from the cabinet of the great and lamented Banks, which is now in the possession of the Linnæan Society.

INSECTA COLEOPTERA.

Sect. Tetramera.

Fam. *Cerambycidæ*, Leach.

LAMIA Amputator. *Fabr.*

Tab. XXX.

L. thorace spinoso, elytris cinereis nigro irroratis maculisque numerosis testaceis.

Fabric. Entom. Syst. tom. i. *b. p.* 276. 34. *Syst. Eleuth.* ii. *p.* 293. 60.

Long.

Long. corp. 11. lin.
Exp. alarum 2 un. 1 lin.

Mus. Soc. Linn. Banks, MacLeay, nostr.

Habitat satis frequens in insulis Americæ æquinoctialis; in insulâ S[ti] Vincentii sæpius obvia, thoracis attritu stridens.

Mimosis arboreis gaudet, præcipue *Mimosâ Lebbek, L.* quas castigat ne nimium luxuriantes vicinas arbores ab aere excludant, quarum sic servatur æquilibrium. Ramos etiam crassiores mandibulis abscindit, ovis primum sub cortice puncturâ factâ siphone depositis. *Lamiâ* serratim circumsecante (unde nomen) ad terram ramus vulneratus cadit citoque perit.

Ova oblonga flaventia, cute tenui tecta, acaris infestantur. (*Fig.* 1.)

Larva (*fig.* 2.) apoda, lucide ochracea, caput versus incrassata, linea dorsali cinerea, quam contrahit vel dilatat animal dum pascit. *Caput* saturate ochraceum, antice brunneum. *Maxillæ* atræ. *Palpi* parvi rufescentes. *Corpus* segmentorum 12, primo maximo, declivi, antice rubente. *Latera* præsertim anum versus ferrugineo-villosa. *Segmenta* superne subtùsque verrucarum ordinibus duobus vel tribus transversis, motum insecti adjuvantibus, instructa; primo, secundo, penultimo, ultimoque glabris. *Tracheæ* ferrugineæ. Ramum excavat maxillarum ictibus sonoris; et ut facilius per varios labyrinthos incedat, nonnunquam retrograda, foramine facto excrementa expellit (*l. c.*). Relictâ demum superficie solâ integrâ, nidoque facto (*l. b.*), metamorphosin subit*.

* Vid. *Observationes quas de Cerambyce violaceo, aliisque phytivoris, in* Act. Soc. Linn., *Entomologorum Britannicorum princeps, Monographiæ Apum Angliæ* Auctor nobis tradidit.

Nympha (*fig.* 3.) ferrugineo-ochracea, parce villosa; spiraculis, elytrorum rudimentis, linea dorsali antennisque convolutis subsaturatioribus. *Segmenta* abdominalia lateraliter prominula. Ad basin antennarum utrinque spina brevis. *Thorax*, dorsum, præcipue autem anus truncatus spinulis ferrugineis muricati. *Femora* pilorum fasciculo instructa, quem deponit nympha se in imaginem conversura.

Imago (*fig.* 4.) Media in hoc genere. *Corpus* totum cinereo-villosum, flavedine intermista. *Thorax* ruga media elevata. *Elytra* punctis minimis elevatis atro-nitidis irrorata, maculisque multis testaceis adspersa: pagina inferiori nitida, fibulâ* humerali sericeâ. *Alæ* hyalino-flavescentes, nervis margineque crassiore ferrugineis. *Pedes* validi quibus arboribus fortiter adhæret, non nisi vi detrahendus. *Ungues* aterrimi. *Antennæ* longæ. *Caput* magnum, declive. *Mandibulæ* atro-brunneæ, compressæ, validissimæ.

Var. β. (forsan mas) colore subsaturatiore, antennis longioribus; articulo extimo elongato, basali excavato-punctato.

Tempus adhuc observandum, forte enim per totum annum occurrit hæcce *Lamia* in omni vitæ stadio.

LARVA.		Quies.	IMAGO.	
Junior. Excluditur ovo.	Adulta. Nymphæ formam induit.		Obvia.	Ova ponit.
Mensibus. II. ♋	Men. ♋. ♌.	Dierum.	Men. V. II. ♋.	Men.

* Fibulis (hamulis *Kirby*), dum quiescit animal, elytra retinentur.

EXPLI-

Lansdown Guilding pinx.t 1818 — *Lamia Amputator* — J. Curtis sculp.

EXPLICATIO TABULÆ XXX.

Figura 1. Lamiæ Amputatoris ova } magnitudine naturali.
2. Larva } magnitudine naturali.
3. Nympha supina } magnitudine naturali.
4. Mas in opus intentus.

Litera A. Ramus mimosæ serratim ab imagine dissectus.
a. a. a. Partes amputatæ.
b. Nymphæ nidus.
c. Foramen quo larva stercus expellit.
d. Rami vulnus.

St. Vincent, April 2, 1821.

 XXVIII. *De-*

XXVIII. *Description of two new Genera of Plants from Nepal.* *By Nathaniel Wallich, M.D. F.L.S. &c.*

Read March 19, 1822.

COLQUHOUNIA.

SYST. ARTIF. *Didynamia Gymnospermia.*
ORDO NATURAL. *Labiatæ.*

CHAR. GEN. *Calyx* cylindricus, fauce æquali 5-dentatâ: fructifer clausus. *Corolla* bilabiata; *labium superius* fornicatum, bidentatum; *inferius* trilobum lobis lateralibus fauci ampliatæ utrinque insertis, intermedio minore integro. *Stamina* adscendentia; *antherarum lobi* divaricati nudi. *Stigma* bilobum, lobo superiore breviore. *Ovula* solitaria, pendula! *Achenia* maxima alata. *Perispermum* copiosum. *Embryo* erectus!

Habitus. Frutex latè volubilis supernè tomento farinoso stellato ferrugineo: *rami juniores* alternatim compressi, subarticulati. *Folia* ovalia, serrata, scabriuscula, odore debili aromatico. *Flores* speciosi, coccinei, fasciculati, axillares, subverticillati, nunc subracemosi.

Dixi in honorem amici æstumatissimi Roberti Colquhoun, Equitis Baroneti, historiæ naturalis fautoris indefessi, qui hortum botanicum Calcuttæ ditavit plurimis plantis viventibus seminibus, speciminibus nec non observationibus phytographiam regionis *Kumaon* spectantibus.

COLQUHOUNIA

COLQUHOUNIA COCCINEA, *Wall.*

Legi in variis montibus Nepaliæ, Chesapang, Chandaghiry, Sheopare; etiam in sylvis minus elevatis Suembonath, Gokurna, &c. Floret sub fine pluviarum et tempore frigoris, ab Octobre ad Februarium. Fructus maturescunt Martio.

Nomen Parbutteum *Aesinallæ*; Newarrense *Goontomah.*

Frutex amplus super alios, arboresque minores volubilis. *Rami* longissimi, orgyales, obsoletè tetragoni, pennam cygneam ad digitum crassi, a punctis minutis copiosis scabriusculi, tomento parco hinc inde conspersi, dilutè ferruginei: juniores gracillimi, obsoletè 4-angulares, sulcis duobus oppositis notati, ad insertionem foliorum alternatim dilatato-complanati lineâque elevatâ annulari subarticulati, vestiti tomento denso ferrugineo lepidoso stellato ciliato friabili. *Folia* opposita, ovata, acuminata, 3—5-pollicaria, vetusta, duplo majora, patentia, obtusè crenulata, basi acutâ integriora, utrinque a tomento parco asperula, suprà atro-viridia, rugosa, opaca, subtùs pallida costâ nervisque suboppositis arcuatis prominentibus tomentosis venisque transversim reticulatis; *novella* densissimè tomentosa incana. *Petioli* unguiculares, semiteretes, tomentosi, suprà plani. *Flores* magni, inodori, fasciculati, plerumque ternati, axillares, subverticillati; *verticilli* nunc brevissimè pedunculati, sæpiùs ferè sessiles, in ramulis junioribus approximati subracemosi. *Pedunculi* teretes, patentes, petiolo triplo breviores, tomentosi, basi, nunc medio quoque, bracteolis duabus oppositis linearibus persistentibus. *Calyx* basi subcylindricus, sursum ampliatus et subcampanulatus, membranaceus, scariosus, persistens, semuncialis, tomentosus, intùs lævis, nitidus, obsoletè 5-nervius et reticulatus, leviter incurvus, dorso

dorso parum convexior, limbo 5-dentato patentiusculo dentibus triangulari-ovatis acutis 1-nerviis post florescentiam clausis et subvalvatis. *Corolla* coccinea, calyce duplo longior, villis canis mollibus brevibus hyalinis articulatis extùs obsita; *tubus* brevis inclusus, cylindricus, mox ampliatus in *faucem* amplam lateribus leviter compressam, subtùs foveolatam perviam nudam. *Limbus* 2-labiatus; *labium superius* adscendens, ovatum, apice bidentatum, dentibus lanceolatis obtusiusculis, fornicatum, basi dorsi leviter contractum et impressum; *inferius* majus, patens, tripartitum, lobis integerrimis obtusis, lateralibus obliquè ovatis leviter recurvis fauci utrinque insertis et quasi interlabialibus: intermedio duplo ferè illis breviore descendente concaviusculo linguæformi citius emarcescente. *Stamina* quatuor absque rudimento quinti, intra galeam adscendentia, haud planè ab illâ recondita sinubus (ut dudum monuit cel. R. Brown in *Prodr. Fl. Nov. Holl.* i. *p.* 500.) interlabialibus primariisque labii inferioris intra faucem inserta. *Filamenta* crassiuscula, linearia, villosula, colorata, apice parum dilatata et incurva; superiora duo breviora. *Antheræ* parvæ, oblongæ, nutantes, purpurascentes: lobis divaricatis (sursum et deorsum) nudis obtusis rimâ continuâ longitudinali et quasi communi dehiscentibus, polline flavo majusculo. *Ovaria* quatuor, oblonga, planiuscula, apice parum obliqua et crenulata, *disco* imposita *hypogyno* annulari angusto obsoletè quadrilobo flavicante centro parum elevatiore subconico, uniloculari, monospora: *ovulum* teres ex apice placentulæ erectæ fungosæ *pendulum!* *Stylus* filiformis, lævis, purpurascens, longitudine staminum cumque illis adscendens. *Stigma* bilobum, lobis subulatis acutis patulis, superiore dimidio breviore. *Achenia* quatuor, rarius unum duove cassa, grandia, calyce persistente haud aucto

dentibus

dentibus conniventibus subvalvatis clauso parum breviora, ejus fundo supra discum hypogynum ferè immutatum inserta, erecta, glabra, exsucca, basi ovalia conniventia convexiuscula intùs obtusè carinata subtrigona, apice terminata alâ membranaceâ parum recurvâ oblonga apice hinc convexâ inde acutâ levissimeque crenulatâ margine altero recto subsulcato crassiore altero (exteriore) convexo scindente, epidermide obducta tenuissimâ fuscescenti; 1-locularia 1-sperma, indehiscentia. *Semen* obovatum compressiusculum, obtusum, basi acutiusculum, album, læve, infra apicem suspensum funiculo longiusculo descendente et supra basin placentæ parvæ fungosæ erectæ liberæ inserto. *Integumentum* simplex, tenuissimum. *Perispermum* crassiusculum, carnosum, album, embryonem arctè involvens eique conforme. *Embryo* ovatus, planus, erectus. *Cotyledones* maximæ, ovatæ, obtusæ, basi subcordatæ. *Plumula* inconspicua. *Radicula* conica, acuta, brevis, infera.

Obs. Genus pulcherrimum *Leucadi*, Burm. (R. Brown *l. cit.* 504.) et *Dracocephalo* quodammodo affine ab utroque et tota ferè familia diversum fructus magnitudine et forma, positione ovuli penduli seminisque suspensi et perispermo copioso. Odor foliorum partiumque novellarum citrinus, debilis.

HEMIPHRAGMA, *Wall.*

Syst. Artif. *Tetrandria monogynia* floribus monopetalis monocarpis inferis. An potius *Didynamia angiospermia?*

Ord. Natural. *Scrophularinæ*, Brown Prodr. Nov. Holl. i. 433.

Char. Gen. *Calyx* 5-partitus. *Corolla* infundibuliformis limbo patente 5-fido subæquali. *Stamina* 4, æqualia, antheris nudis liberis. *Stigma* simplex, acutum. *Bacca* globosa exsucca

succa incompletè 2-locularis, polysperma, dissepimento placentifero sursum fisso.

Habitus. *Herba* gracilis, repens, pilosula. *Folia* duplicis indolis; *caulina* et *ramea* orbiculato-reniformia, opposita, subsessilia, dentata: alia acerosa, conferta in fasciculos petiolatos, gracillima. *Flores* solitarii, parvi, rosei, brevè pedicellati, ebracteati, axillares foliorum majorum alterni vel oppositi, vel terminales ramulorum novellorum. *Baccæ* globosæ, ruberrimæ, nitidæ.

HEMIPHRAGMA HETEROPHYLLUM, *Wall.*

Planta sat communis in montibus Nepaliæ saxatilis florens et fructifera toto ferè anno, præcipue ab Octobre ad Februarium.

Caulis gracillimus, pedalis bipedalisque, prostratus, et per distantiam pollicum 3 vel 4 radicans, radiculis simplicibus pallidis fibrillosis, obsoletè quadrangularis, epidermide fuscescente secedente. *Rami* pauci versus extremitatem caulis, tenerrimi, indivisi, breves, oppositi, acutanguli, asperuli a pilis brevibus articulatis patentibus hyalinis. *Folia* difformia. *Caulina* ovato-cordata subreniformia plana, patentia, membranacea, citiùs emarcescentia, opposita et ferè amplexicaulia, brevissimè petiolata, unguicularia ad pollicaria, remota, interdum pollices plures distantia, obtusa, acutiusculè et lato-dentata, lobis baseos integris rotundatis, utrinque pilosula, subtùs trinervia leviterque reticulato-venosa, siccitate ferruginea; superiora et ramea ovata vel suborbiculata, pauca, bracteiformia, ter quaterve minora. *Folia* alia subulato-acerosa, 2—3-linearia semiteretia, suprà sulcata, pilosula, acuta, lætè viridia, nitida, sessilia, undique patentia, 20—30 circiter conferta in fasciculos ovatos unguiculares

culares breve petiolatos patentes, axillares foliorum caulinorum oppositos vel terminales. *Petioli* foliorum majorum vix 2-lineares, suprà sulcati, pilosuli, basi lineolâ tenuissimâ caulem vel ramum ambientes. *Stipulæ* nullæ. *Flores* parvi, solitarii, axillares, vel centrales in fasciculis *pedicello* insidentes brevissimo villoso ebracteato. *Calyx* subovatus, persistens, densè villosus, profundè 5-partitus, *laciniis* patentiusculis linearibus purpureo-acutis. *Corolla* rosea, calyce duplo major, infundibuliformis, glabra ; *tubus* obsoletè 4-gonus medio ventricosus, florescens ; *limbus* patens, 5- (raro 6-) fidus, valde obscure 2-labiatus, æstivatione imbricatus, laciniis ovalibus obtusis nunc parum retusis, duabus superioribus parum latioribus ; *faux* pervia, nuda. *Stamina* quatuor æqualia parum supra faucem elevata medio tubi inserta, antheris ovatis erectis parum conniventibus utrinque longitudinaliter dehiscentibus nudis. *Pistillum* staminibus parum brevius ; *ovarium* subrotundum, læve ; *disco hypogyno* exiguo annulari flavicante suffultum, biloculare, polysporum, ovulis placentæ dissepimento apice minutim perforato utrinque adnatæ insertis ; *stylus* teres brevis ; *stigma* leviter incrassatum, simplex, acutum. *Bacca* ovato-globosa, magnitudine pisi, stylo persistente coronata, suffulta calyce patentissimo haud aucta, coccinea, lævissima, nitida, inscripta lineis gracillimis impressis quatuor e vertice cruciatim decurrentibus, commissuras valvarum mentientibus, cultro difficilius in totidem valvulas partibilibus, nunquam sponte dehiscens ; *membrana exterior* tenuissima, chartacea : *caro* spongiosa, pallida, basi copiosior vertice tenuior. *Dissepimentum* incompletum, membranaceum, tenuissimum, vertice perforatum hiatu inversè triangulari ætate ultra medium baccæ deorsum extenso. *Placentæ* duæ semilunato-bicornes spongiosæ, convexæ, hiatui dissepimenti

 utrinque

utrinque adnatæ, ibique confluentes, medio crassiores, sursum attenuatæ, rugosulæ. *Semina* numerosa, minuta, pallide ferruginea, ovata, sessilia, punctata, mox soluta fundumque baccæ utrinque occupantia. *Integumentum* simplex. *Perispermum* carnosum, aqueo-pallidum, tenue, semine conforme. *Embryo* dicotyledoneus. *Radicula* centripeta.

Obs. Plantula elegantissima *Scrophularinis* potius quam *Gentianeis* Juss. adsocianda, ab his discrepans corolla staminibusque, ab illis quodammodo abludens structurâ fructûs. An *Solanearum* civis? Nomen imposui a septo incompleto quasi dimidiato.

XXIX. Ex-

XXIX. Extracts *from the* Minute-Book *of the* Linnean Society *of* London.

Nov. 2, 1819. Dr. Maton, Vice-President, communicated a Letter from the Rev. Revett Sheppard, F.L.S., giving an account of the *Coluber Chersea* of Linnæus, *Trans. Linn. Soc.*, *vol.* xii. *p.* 349, and the *C. Prester*, having been found in the parish of Levington and other places in the county of Suffolk, in arid waste situations, where, from the circumstance of the *Strix brachyotos* frequenting the same places during six months of the year, it is probable that those vipers feed on mice.

Mar. 7, 1820. The Rev. William Whitear, F.L.S. communicated the following Remarks by Mr. J. Youell of Yarmouth in Norfolk :—In the spring of 1818, Mr. Youell procured from the marshes at Winterton upwards of thirty eggs of the Shoveler Duck (*Anas clypeata* Linn.). These eggs were put under some domestic fowls, and most of them were hatched ; but he succeeded in rearing only two of them. Their bills, when a few days old, were not longer than those of the domestic Duck, but at the age of three weeks they had obviously increased in length more than those of the common Duckling. One of these birds, a male, lived till it was ten months old, and then had attained in a considerable degree the adult plumage of the Shoveler.

 Mr.

Mr. Youell observes that, although the usual food of the Scoter (*Anas nigra*, Linn.) consists of shell-fish and other marine productions, it will readily feed upon corn. A bird of this species was kept alive by him for several months, and fed upon barley.

In the summer of 1817 Mr. Youell had four young birds of the Teal (*Anas Crecca*, Linn.), which were hatched at Rudham in Norfolk.

From minute observations on the male birds of the Godwit (*Limosa rufa*, Temminck), killed at different periods, Mr. Youell is convinced that they do not change the colour of their plumage in spring by shooting their feathers, but that the change is effected by the cinereous feathers themselves becoming bay; for he has frequently observed upon the same individual cinereous feathers more or less blotched with bay colour.

Mr. Youell has also ascertained that the Pochard (*Anas ferina*, Linn.) breeds on Scoulton-mere in Norfolk, where several were seen in May last sitting on their nests, and with the young nearly excluded.

May 2. Mr. William Ross, F.L.S. announced in a Letter to the Secretary, that on the 6th of December last he discovered a species of *Cyclamen* in flower, and growing in great abundance in a wood on Alderdown Farm, in the parish of Sandhurst in Kent, on a poor yellow sandy loam soil. The flowers were red, white, and purple. Mr. Ross considers this to be the *Cyclamen europæum* of *Engl. Bot.* (*C. hederifolium, Smith Compend. Flor. Brit.*) and what is known among gardeners by the name of *C. autumnale*.

Nov. 21. Read a Letter from Mr. J. Youell of Yarmouth, in which

which he states, that a fine specimen of *Ardea comata* of Pallas, and of *Gmel. Syst. Nat.* i. *p.* 632. *n.* 41., was taken on the 20th of July last in a fisherman's net, whilst drying, at Ormsby in Norfolk, within fifty yards of the spot where the African Heron (*Ardea capsica*, Lath.), formerly in the possession of Montagu, and now in the British Museum, was taken about five years ago.

Dr. Leach communicated an extract of a Letter, addressed to him by Robert Scarth, Esq., containing some observations on tho œconomy of the *Procellaria pelagica*, or Stormy Petrel. Mr. Scarth states, that in passing over a tract of peat-moss, near the shore, in a small uninhabited island in Orkney, one evening in the month of August last, he was surprised to hear a low purring noise, somewhat resembling the sound of a spinning-wheel in motion; and on inquiry, he was informed by one of the boatmen who accompanied him, that it was the noise commonly emitted by the *Alimonty* (the Orkney name for the Stormy Petrel), that frequented the island when hatching.

On examining a small hole in the ground, he found the bird and its nest, which was very simple, being little more than a few fragments of shells laid on the bare turf. It contained two round pure-white eggs, which were very large in comparison with the size of the bird. When he seized the bird, she squirted out of her mouth an oily substance of a very rancid smell. He took her home, and having put her into a cage, he offered her various kinds of worms to eat: but, as far as he could observe, she ate nothing till after the expiration of four days, when he observed that she occasionally drew the

feathers

feathers of her breast singly across, or rather through her bill, and appeared to suck an oily substance from them. This induced him to smear her breast with common train-oil; and observing that she greedily sucked the feathers, he repeated the smearing two or three times in each day for about a week. He then placed a saucer containing oil in the cage, and he observed that she regularly extracted the oil by dipping her breast in the vessel, and then sucked the feathers as before. In this way he kept her for three months. After feeding she sat quietly at the bottom of the cage, sometimes making the same purring noise which first attracted his notice, and sometimes whistling very shrilly.

Feb. 6, 1821. Dr. Sims, F.L.S. communicated some observations on the œconomy of the Toad (*Rana Bufo*) by William Fothergill, Esq. of which the following is an extract:—"The common food of the Toad is small worms, and insects of every description; but its favourite food consists of *Apis mellifica*, *A. conica*, *A. terrestris*, and *Vespa vulgaris*. When a Toad strikes any of these insects, however, deglutition does not immediately take place as in other cases, but the mandibles remain closely compressed for a few seconds, in which time the bee or wasp is killed, and all danger of being stung avoided. The mandibles are provided with two protuberances, which appear to be destined for this office. Although capable of sustaining long abstinence, the Toad is a voracious feeder when opportunity offers. To a middle-sized one the writer has given nine wasps, one immediately after another; the tenth it refused, but in the afternoon of the same day it took eight more.

To

To see the Toad display its full energy of character, it is necessary to discover it in its place of retirement for the day, and, if possible, unperceived to drop an insect within its sight: it immediately arouses from its apparent torpor, its beautiful eyes sparkle, it moves with alacrity to its prey, and assumes a degree of animation incompatible with its general sluggish appearance. When arrived at a proper distance, it makes a full stop, and, in the attitude of a pointer, motionless eyes its destined victim for a few seconds, when it darts out its tongue upon it, and lodges it in its throat with a velocity which the eye can scarcely follow. It sometimes happens to make an ineffectual stroke, and stuns the insect without gorging it, but never makes a second stroke until the insect resumes motion. It uniformly refuses to feed on dead insects, however recent. For several years a Toad took up its abode during the summer season under an inverted garden-pot, which had a part of its rim broken out, in the writer's garden, making its first appearance in the latter end of May, and retreating about the middle of September. This Toad, there is reason to believe, distinguished the persons of the family, who daily fed it, from strangers; as it would permit them to pat and stroke it. To try the indiscriminating appetite of these animals, the writer has dropped before a full-grown Toad a young one of its own species, about three-fourths of an inch long, and the instant it began to move off, it was eagerly struck at and swallowed; but the writer, in repeating this experiment, found that more will refuse than devour the young of their own species. When living minows (*Cyprinus Phoxinus*) were dropped before a Toad,

Toad, they were struck at and swallowed in the same manner. These experiments were made on Toads at full liberty and met with accidentally. Toads generally return to their winter quarters about the time that swallows disappear. The writer on such occasions has seen them burrowing in the ground backwards, by the alternate motion of their hind legs."

To this communication Dr. Sims adds, that a tame Kite, which he kept for some time, though frogs were its favourite food, would never eat a Toad; but whilst killing it, which he would always do when presented to him, showed signs of the greatest horror, screaming aloud at every peck he gave it, and retreating a little way, as if afraid of receiving some injury from it, but returning again to the attack till he had deprived it of life. Dr. Sims also states, that upon passing a shock from a small electrical battery through a Toad, the surface of its back was immediately covered with small drops of a substance as white as milk, which seemed to ooze from every pore.

May 24. Living specimens of *Linnæa borealis* were presented by Miss Emma Trevelyan, by whom it was discovered for the first time in England on the 1st of September last, growing in a plantation consisting chiefly of Scotch fir, about seventy years old, at Catcherside, in the parish of Hartburn in Northumberland.

Nov. 20. Read a Letter from W. R. Whatton, Esq. to the Secretary, dated Manchester, 7th November, stating that in the last summer, while a Hull whale-ship was beset in the ice in the North Seas, the crew took a female Narwhal (*Monodon monoceros*) with a tooth in the upper jaw, perfect, and in every respect like those of the

the males, though not so large. The sex of this animal was satisfactorily ascertained in cutting up, when two fœtuses were taken out of it.

Read a Letter from James Clealand, Esq. of Rathgael House, near Bangor in the county of Down, Ireland, containing an account of a new species of *Patella*, which has been named by Mr. Sowerby *Patella Clealandi*. Mr. Clealand describes it as follows: Shell oval, white, with red-brown or purple spots; faintly striated longitudinally, and still more faintly transversely; summit obtuse, lateral, tinged with light purple; margin entire; inside white, with a dark-brown muscular impression. The young shells are very thin, but the old are nearly opake. The size of the largest specimen yet found is 9½-tenths of an inch in length, 7-tenths in breadth, and 4-tenths in height. There is a dark-brown variety, with two indistinct rays from the apex, one on each side.

This shell was first found by Mr. Clealand in June 1819, at low-water mark, on a smooth stone forming a part of the breakwater at Port George, near Bangor. And it has since been found in great numbers at the same place during very low ebbs.

Dec. 18. Dr. Maton, V.P. presented a Panicle of *Holcus Sorghum*, raised in the garden of the Bishop of Durham, H.M.L.S. at Mongewell, from seeds collected on the Himáláya mountains in Hindostan. Seeds from this Panicle were stated by Dr. Maton to have grown freely in Mr. Walcott's garden at Oundle this year.

Read the following Extract from a Letter from Mr. Patrick Hill, Surgeon in the Royal Navy, dated Sydney, New

New South Wales, 3d January 1821, addressed to the Secretary:

"You will be gratified to learn, that I have been completely successful in establishing our friend Sir John Jamison's account of the spur of the *Ornithorhynchus paradoxus.* I subjoin an extract from my notes: '*Sunday, Oct.* 1, 1820.—On the banks of Campbell's River. In the morning shot a male *Ornithorhynchus.* On examination, soon after it was killed, I observed near the extremity of the convex side of the spur, a minute spot, like the orifice of a tube; and on endeavouring to pass a bristle from this spot, three successive drops of a limpid clear fluid issued from it. I then examined the other spur with the same result. On dissecting the foot of the animal, I found at the inner side of the root of the spur, immediately over the articulation, a small cyst, which I cut into; it did not at that time contain any fluid; but from it I, with great ease, passed a horse-hair through the spur. This preparation I have sent to you, together with the dried cyst.'

"You will also be pleased to learn, that I have been fortunate enough to get an impregnated female of this interesting animal. I give you another extract from my notes: '*Bathurst, Oct.* 13.—After breakfast went with Mr. Scott to examine a hole, where we had been told that a wounded *Ornithorhynchus* had taken refuge, and which we hoped might prove to be the animal's nest; but on digging we found it to be that of a Rat. On returning, however, we were gratified in finding that a female *Ornithorhynchus* had been brought in alive, having been

been found on its nest in a lagoon near Campbell's River, by Mr. Rawley, who says that he was obliged to tear the nest to pieces before he could get the animal out, the nest being formed of reeds and rushes, with a long tube or entrance into it, out of which the bill of the animal only was visible. The animal was placed in a bucket of water, in which it seemed to enjoy itself for some time, occasionally getting on its back in the water to scratch its head with the hind foot. The eyes are small and prominent, of a muddy-brown colour, with blue pupil, and are situated immediately behind the skinny flap at the base of the bill. After a short time it did not seem to like being in the water, and therefore it was taken out; a string was tied round the leg, and it was allowed to go on the grass, where it crawled along, seemingly with difficulty. It appeared to like having its head scratched, as it allowed me to do so without moving. '*Oct.* 14.—Found the *Ornithorhynchus* nearly dead, and proceeded to examine its structure. The *rectum*, *vagina*, and urinary bladder have one common orifice. On opening the abdomen I was much gratified to find in the left ovarium a round yellow *ovum*, about the size of a small pea. There were also two of smaller size, and an immense number of minute vesicles, hardly perceptible to the eye, but distinctly visible under the microscope. There was no uterus, nor any viscus similar to it, but only a tube leading up from the cloaca, which divided into two ducts leading to the ovaries, similar in situation to the Fallopian tubes of viviparous animals, but much larger and wider. There was not any appearance of impregnation in the right ovarium.' I cut out the

whole

whole of the internal parts of generation, the urinary bladder, part of the rectum, and also the whole of the cloaca unexamined, and put them into spirits. This preparation is now in the possession of Mr. Scott, who is to take it with him to England, and who will, I am sure, feel much pleasure in showing it to you*. In this preparation the urinary bladder must not be mistaken for an uterus.

"Cookoogong a native, chief of the Boorah-Boorah tribe, says, that it is a fact well known to them, that this animal lays two eggs, about the size, shape, and colour of those of a hen; that the female sits a considerable time on her eggs in a nest which is always found among the reeds on the surface of the water; that the animal can run on the grass, and is sometimes found at a considerable distance from the water; that he is also perfectly aware that a wound from the spur of the male is followed by swelling and great pain; but although he has seen many cases of it, he has never known it fatal; that the flesh of the animal is never eaten, and that the native name is *Mullingong*.'

April 16, 1822. The Secretary exhibited two living individuals of the *Lemur albifrons* of Geoffroy St. Hilaire, from Madagascar, male and female.—It appears that M. Geoffroy had seen only the male of this species; and M. Desmarest, in Deterville's *Dictionnaire d'Histoire Naturelle*, considers the *Lemur anjuanensis* of Geoffroy, which has no white about the face, as the female of *Lemur albi-*

* Mr. Scott, on his arrival in England, presented the preparation to the University of Oxford.

frons;

frons; whereas, both sexes of the animals now exhibited are marked alike in this respect.

May 24. A marble Bust of the late Right Honourable Sir Joseph Banks, Bart., G.C.B. Hon. Mem. Linn. Soc., which has been executed by Mr. Chantry, was placed in the Meeting Room. It was paid for by subscription of the following Members of the Society, viz.

William Townsend Aiton, Esq.
Mr. William Anderson
William, Lord Bagot
Rev. Sackville Bale, M.A.
Robert Barclay, Esq.
Edward Barnard, Esq.
John Barrow, Esq. F.R.S.
Thomas, Marquis of Bath, LL.D. F.A.S.
Robert Batty, M.D.
Francis Bauer, Esq. F.R.S.
William Beatty, M.D. F.R.S.
John, Duke of Bedford
Charles Bell, Esq. F.R.S. Ed.
Thomas Bell, Esq.
William Bentham, Esq.
James E. Bicheno, Esq.
John Blackburne, Esq. M.P. F.R.S.
James T. Bland, Esq.
Michael Bland, Esq. F.R.S. and A.S.
William Borrer, Jun. Esq.
William Bowles, Esq.
John Bowring, Esq.
Henry Boys, Esq.
John William, Earl of Bridgewater, F.R.S.
William Bridgeman, Esq. F.R.S.
James Brodie, Esq. F.R.S. and A.S.
Henry J. Brooke, Esq. F.R.S.
Rev. John Brooke, M.A.
Robert Brown, Esq. F.R.S. *Librarian*
Mr. William Bullock
John Caley, Esq. F.R.S. and A.S.
Samuel, Lord Bishop of Carlisle, LL.D. V.P. R.S. *Vice-President.*
Richard Cartwright, Esq.
John Cator, Esq.
William Cattley, Esq.
Henry T. Colebrooke, Esq. F.R.S.
Charles Collinson, Esq.
Joseph Correa de Serra, LL.D. F.R.S.
Rev. W. Coxe, M.A. F.R.S. and A.S.
John Cresswell, Esq.
Sir Alex. Crichton, Knight, M.D. F.R.S.
Sir Thomas Gery Cullum, Bart. F.R.S.
Rev. James Dalton, M.A.
David Elisha Davy, Esq.
Mr. James Dickson
John Dunston, Esq.
Hon. Shute, Lord Bp. of Durham, LL.D.
Sir William Elford, Bart. F.R.S.
John Ellis, Esq. F.R.S.
John Fleming, Esq. M.P. F.R.S.
Andrew Forster, Esq.
Edward Forster, Esq. F.R.S. *Treasurer*
Thomas F. Forster, Esq.
Sir Thomas Frankland, Bart. F.R.S.
Rev. Thomas Garnier, M.A.
Sir George S. Gibbes, Kt. M.D. F.R.S.
Rev. Joseph Goodall, D.D.

Sir

Sir James Graham, Bart. M.P.
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The Binder is requested to observe, that as a general Title-page and a Table of Contents for the whole Volume are now given, the Title-pages to the separate Parts, and the Table of Contents for Part I. are to be cancelled.

END OF THE THIRTEENTH VOLUME.

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